

The background of the cover features a large, stylized illustration of a motorcycle's front end, including the headlight, fender, and front wheel, rendered in white lines on a dark background. Overlaid on this are several large, interlocking gears in shades of gray. The Honda logo, consisting of a red wing emblem and the word "HONDA" in red, is positioned at the top left.

**HONDA**

**SERVICE MANUAL**

**CB900F**  
**919**

## A Few Words About Safety

### Service Information

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

### For Your Customer's Safety

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

### For Your Safety

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts – wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommend that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

### Important Safety Precautions

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise. This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts or coolant. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel-related parts.

### WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

### WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

# HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CBR600F.

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Sections 4 through 19 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of that section.

Most sections start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedures.

If you don't know the source of the trouble, go to section 22, Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle. You must use your own good judgment.

You will find important safety information in a variety of forms including:

- Safety Labels – on the vehicle
- Safety Messages – preceded by a safety alert symbol and one of three signal words, DANGER, WARNING, or CAUTION.


These signal words mean:

**DANGER** You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

**WARNING** You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

**CAUTION** You CAN be HURT if you don't follow instructions.

- Instructions – how to service this vehicle correctly and safely.

As you read this manual, you will find information that is preceded by a  symbol. The purpose of the message is to help prevent damage to your vehicle, other property, or the environment.

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. Honda Motor Co., Ltd. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATSOEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION. THIS MANUAL IS WRITTEN FOR PERSONS WHO HAVE ACQUIRED BASIC KNOWLEDGE OF MAINTENANCE ON Honda MOTORCYCLES, MOTOR SCOOTERS OR ATVS.












Honda Motor Co., Ltd.  
SERVICE PUBLICATION OFFICE

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## SYMBOLS

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it will be explained specifically in the text without the use of the symbols.

	Replace the partial with new one(s) before assembly.
	Use the recommended engine oil, unless otherwise specified.
	Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1)
	Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)
	Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® BR-2 plus manufactured by Dow Corning U.S.A. Multi-purpose M-2 manufactured by Mitsubishi Oil, Japan
	Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent). Example: Molykote® G-n Paste manufactured by Dow Corning U.S.A. Honda Moly 60 (U.S.A. only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan
	Use silicone grease.
	Apply a locking agent. Use a medium strength locking agent unless otherwise specified.
	Apply sealant.
	Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
	Use fork or suspension fluid.



# 1. GENERAL INFORMATION

**1**

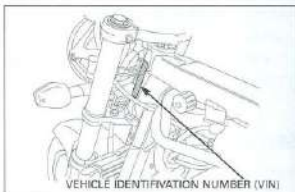
SERVICE RULES	1-1	LUBRICATION & SEAL POINTS	1-18
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## SERVICE RULES

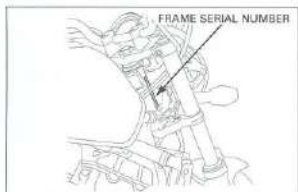
1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet Honda's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on pages 1-22 through 1-32, Cable and Harness Routing.

## GENERAL INFORMATION

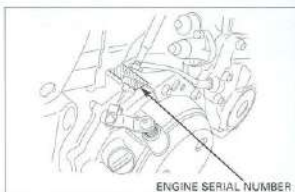
### MODEL IDENTIFICATION



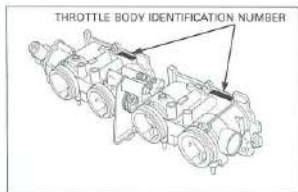
The Vehicle Identification Number (VIN) is located on the left side of the frame near the steering head.



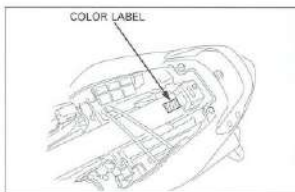
The engine serial number is stamped on the right side of the upper crankcase.



The frame serial number is stamped on the right side of the steering head.



The throttle body identification number is stamped on the intake side of the throttle body as shown.



The color label is attached as shown. When ordering color-coded parts, always specify the designated color code.

## SPECIFICATIONS

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	2,125 mm (83.7 in)
	Overall width	750 mm (29.5 in)
	Overall height	1,085 mm (42.7 in)
	Wheelbase	1,460 mm (57.5 in)
	Seat height	795 mm (31.3 in)
	Footpeg height	345 mm (13.6 in)
	Ground clearance	145 mm (5.7 in)
	Dry weight	Except California type 194 kg (428 lbs) California type 195 kg (430 lbs)
	Curb weight	Except California type 218 kg (481 lbs) California type 219 kg (483 lbs)
	Maximum weight capacity	174 kg (384 lbs)
FRAME	Frame type	Diamond
	Front suspension	Telescopic fork
	Front axle travel	109 mm (4.3 in)
	Rear suspension	Swingarm
	Rear axle travel	128 mm (4.7 in)
	Front tire size	120/70 ZR 17 (58W), 120/70 ZR 17 M/C (58W)
	Rear tire size	180/55 ZR 17 (73W), 180/55 ZR 17 M/C (73W)
	Front tire brand	BT56F RADIAL N (Bridgestone) TX15 (Michelin)
	Rear tire brand	BT56R RADIAL G (Bridgestone) TX25 (Michelin)
	Front brake	Hydraulic double disc
	Rear brake	Hydraulic single disc
	Caster angle	25°
	Trail length	98 mm (3.9 in)
ENGINE	Fuel tank capacity	19.0 liter (5.02 US gal, 4.18 imp gal)
	Cylinder arrangement	4 cylinders in-line, inclined 30° from vertical
	Bore and stroke	71.0 X 58.0 mm (2.80 X 2.28 in)
	Displacement	919 cm <sup>3</sup> (56.1 cu-in)
	Compression ratio	10.8 : 1
	Valve train	Chain driven, DOHC
	Intake valve	opens at 1 mm (0.04 in) lift closes 10° BTDC
	Exhaust valve	opens 30° ABDC closes 35° BBDC
	Lubrication system	5° ATDC Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Paper element
	Engine dry weight	68 kg (150 lbs)
	Firing order	1 - 2 - 4 - 3

## GENERAL INFORMATION

GENERAL (Cont'd)		
	ITEM	SPECIFICATIONS
CARBURATION	Type Throttle bore	PGM-FI (Programmed Fuel Injection) 36 mm (1.4 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th 6th Gearshift pattern	Multi-plate, wet Cable operating Constant mesh, 6-speeds 1.52 (76/50) 2.688 (43/16) 2.769 (36/13) 2.000 (26/13) 1.600 (24/15) 1.368 (26/19) 1.227 (27/22) 1.130 (26/23) Left foot operated return system, 1 - N - 2 - 3 - 4 - 5 - 6
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Computer-controlled digital transistorized with electric advance Electric starter motor Triple phase output alternator SCR shorted/triple phase, full wave rectification Battery

Unit: mm (in)

## LUBRICATION SYSTEM

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.5 liter (3.7 US qt, 3.1 imp qt)	—
	After draining/filter change	3.6 liter (3.8 US qt, 3.2 imp qt)	—
	After disassembly	4.4 liter (4.6 US qt, 3.9 imp qt)	—
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (USA & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil API service classification SG or Higher except oils labeled as energy conserving on the API service label. JASO T903 standard MA Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		490 kPa (5.0 kgf/cm <sup>2</sup> , 71 psi) at 8,000 min <sup>-1</sup> (rpm)/(80°C/176°F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 - 0.22 (0.006 - 0.009)	0.35 (0.014)
	Side clearance	0.02 - 0.07 (0.001 - 0.003)	0.10 (0.004)

## FUEL SYSTEM (Programmed Fuel Injection)

ITEM		SPECIFICATIONS
Throttle body identification number	Except California type	GQ34C
	California type	GQ34B
Starter valve vacuum difference		2664 Pa (20 mm Hg)
Base throttle valve for synchronization		No.2
Idle speed		1,200 ± 100 min <sup>-1</sup> (rpm)
Throttle grip free play		2 - 4 mm (1/16 - 3/16 in)
Intake air temperature sensor resistance (at 20°C/68°F)		1 - 4 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)		2.3 - 2.5 kΩ
Fuel injector resistance (at 20°C/68°F)		11.1 - 12.3 Ω
PAIR solenoid valve resistance (at 20°C/68°F)		20 - 24 Ω
Cam pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Manifold absolute pressure at idle		200 - 250 mm Hg
Fuel pressure at idle		343 kPa (3.5 kgf/cm <sup>2</sup> , 50 psi)
Fuel pump flow (at 12 V)		256 cm <sup>3</sup> (8.7 US oz, 9.0 imp oz) minimum/10 seconds

## GENERAL INFORMATION

COOLING SYSTEM		ITEM	SPECIFICATIONS
Coolant capacity		Radiator and engine	3.2 liter (3.38 US qt, 2.82 imp qt)
		Reserve tank	0.8 liter (0.85 US qt, 0.70 imp qt)
Radiator cap relief pressure			108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Thermostat		Begin to open	80 – 84 °C (176 – 183 °F)
		Fully open	95°C (203 °F)
		Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors specifically recommended for use in aluminum engines	
Standard coolant concentration		50 – 50% mixture with soft water	

CYLINDER HEAD/VALVES				Unit: mm (in)
ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,275 kPa (13.6 kgf/cm <sup>2</sup> , 185 psi) at 350 min <sup>-1</sup> (rpm)	—
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.25 ± 0.03 (0.010 ± 0.001)	—
Camshaft	Cam lobe height	IN	36.040 – 36.280 (1.419 – 1.428)	36.01 (1.42)
		EX	35.800 – 36.040 (1.409 – 1.418)	35.77 (1.41)
	Runout	—		0.05 (0.002)
	Oil clearance	0.020 – 0.062 (0.008 – 0.0025)		0.10 (0.004)
Valve lifter	Valve lifter O.D.	25.978 – 25.993 (1.0228 – 1.0233)		25.97 (1.022)
	Valve lifter bore I.D.	26.010 – 26.026 (1.0240 – 1.0246)		26.04 (1.025)
Valve, valve guide	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.465 (0.1754)
	Valve guide I.D.	IN/EX	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	14.5 – 14.7 (0.57 – 0.58)	—
		EX	14.8– 15.0 (0.58 – 0.59)	—
Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)	
Valve spring free length		IN	40.9 (1.61)	40.08 (1.578)
		EX	40.9 (1.61)	40.08 (1.578)
Cylinder head warpage			—	0.10 (0.004)

Unit: mm (in)

**CLUTCH/GEARSHIFT LINKAGE**

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 - 20 (3/8 - 13/16)	—
Clutch	Spring free length	48.8 (1.92)	47.5 (1.87)
	Disc thickness	2.92 - 3.08 (0.115 - 0.121)	2.6 (0.10)
	Plate warpage	—	0.30 (0.012)
Clutch outer guide	I.D.	24.994 - 25.004 (0.9840 - 0.9844)	25.01 (0.985)
	O.D.	34.975 - 34.981 (1.3770 - 1.3776)	34.97 (1.377)
Mainshaft O.D. at clutch outer guide		24.980 - 24.993 (0.9835 - 0.9840)	24.96 (0.983)
Shift fork, fork shaft	I.D.	12.000 - 12.021 (0.4724 - 0.4733)	12.03 (0.474)
	Claw thickness	5.93 - 6.00 (0.233 - 0.236)	5.9 (0.23)
	Shift fork shaft O.D.	11.957 - 11.968 (0.4707 - 0.4712)	11.95 (0.470)

Unit: mm (in)

**ALTERNATOR/STARTER CLUTCH**

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	51.699 - 51.718 (2.0354 - 2.0361)	51.684 (2.0348)

Unit: mm (in)

**CRANKCASE/PISTON/CYLINDER**

CRANKCASE/PISTON/CYLINDER		ITEM	STANDARD	SERVICE LIMIT
Cylinder	I.D.		71.000 – 71.015 (2.7953 – 2.7963)	71.10 (2.795)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.06 (0.002)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	—
	Piston O.D.		70.965 – 70.985 (2.7939 – 2.7947)	70.90 (2.791)
	Piston O.D. measurement point		15 mm (0.6 in) from bottom of skirt	—
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.03 (0.670)
	Piston pin O.D.		16.993 – 17.000 (0.6690 – 0.6693)	16.96 (0.669)
	Piston-to-piston pin clearance		0.002 – 0.015 (0.0001 – 0.0006)	—
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.07 (0.003)
	Piston ring end gap	Top	0.28 – 0.38 (0.011 – 0.015)	0.5 (0.02)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
Oil (side rail)		0.2 – 0.7 (0.01 – 0.03)	0.9 (0.04)	
Cylinder-to-piston clearance			0.015 – 0.050 (0.0006 – 0.0020)	—
Connecting rod small end I.D.			17.012 – 17.034 (0.6699 – 0.6706)	17.04 (0.671)
Connecting rod-to-piston pin clearance			0.016 – 0.041 (0.0006 – 0.0016)	—
Crankpin oil clearance			0.030 – 0.062 (0.0012 – 0.0020)	0.06 (0.002)



## GENERAL INFORMATION

### CRANKSHAFT/TRANSMISSION

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout		—	0.30 (0.012)
	Main journal oil clearance		0.017 – 0.035 (0.0007 – 0.0014)	0.04 (0.002)
Transmission	Gear I.D.	M5, M6	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1	24.000 – 24.021 (0.9449 – 0.9547)	24.04 (0.946)
		C2, 3, 4	31.000 – 31.025 (1.2205 – 1.2216)	31.04 (1.222)
	Bushing O.D.	M5, 6	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C2	30.955 – 30.980 (1.2187 – 1.2197)	30.93 (1.218)
		C3, 4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Bushing I.D.	M5	24.985 – 25.006 (0.9837 – 0.9845)	25.02 (0.985)
		C2	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
	Gear-to-bushing clearance	M5, 6	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C2	0.020 – 0.070 (0.0008 – 0.0028)	0.11 (0.004)
		C3, 4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O.D.	M5	24.967 – 24.980 (0.9830 – 0.9835)	24.96 (0.983)
		Clutch outer guide	24.980 – 24.993 (0.9835 – 0.9840)	24.96 (0.983)
	Countershaft O.D.	C2	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)
		C2	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)

# GENERAL INFORMATION

Unit: mm (in)

## FRONT WHEEL/SUSPENSION/STEERING

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
	Driver and passenger	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
Axle runout		—	0.2 (0.01)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	282.3 (11.1)	276.7 (10.89)
	Tube runout	—	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—
	Fluid level	156 (6.1)	—
Fluid capacity		463 ± 2.5 cm <sup>3</sup> (15.7 ± 0.08 US oz, 16.3 ± 0.09 imp oz)	—
Steering head bearing pre-load		10 – 15 N·m (1.0 – 1.5 kgf)	—

Unit: mm (in)

## REAR WHEEL/SUSPENSION

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—	2.0 (0.08)
Cold tire pressure	Driver only		290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—
	Driver and passenger		290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—
Axle runout			—	0.2 (0.01)
Wheel rim runout	Radial		—	2.0 (0.08)
	Axial		—	2.0 (0.08)
Wheel balance weight			—	60 g (2.1 oz) max.
Drive chain	Size/link	DID	DID80VA8-114LE	—
		RK	RK50HFOZ5-114LE	—
	Slack		30 – 40 (1.2 – 1.6)	—

## GENERAL INFORMATION

### HYDRAULIC BRAKE

Unit: mm (in)

HYDRAULIC BRAKE			STANDARD	SERVICE LIMIT
ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	—
	Brake disc thickness		4.3 – 4.7 (0.17 – 0.19)	3.5 (0.14)
	Brake disc runout		—	0.3 (0.012)
	Master cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Master piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Caliper cylinder I.D.	A	30.230 – 30.280 (1.1902 – 1.1921)	30.29 (1.193)
		B	27.000 – 27.050 (1.0630 – 1.0650)	27.06 (1.065)
	Caliper piston O.D.	A	30.148 – 30.198 (1.1859 – 1.1889)	30.14 (1.187)
B		26.918 – 26.968 (1.0598 – 1.0617)	26.91 (1.059)	
Rear	Specified brake fluid		DOT 4	—
	Brake disc thickness		4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
	Brake disc runout		—	0.30 (0.012)
	Master cylinder I.D.		12.700 – 12.743 (0.49999 – 0.5017)	12.755 (0.5022)
	Master piston O.D.		12.667 – 12.684 (0.4993 – 0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.		38.180 – 38.230 (1.503 – 1.505)	38.24 (1.506)
	Caliper piston O.D.		38.098 – 38.148 (1.4999 – 1.5019)	38.09 (1.500)

### BATTERY/CHARGING SYSTEM

BATTERY/CHARGING SYSTEM			
ITEM			SPECIFICATIONS
Battery	Capacity		12V – 8.6 Ah
	Current leakage		1.2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5 – 10 h
		Quick	5.0 A/1 h
Alternator	Capacity		0.38 kW/5,000 min <sup>-1</sup> (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω

### IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug	NGK	CR8EH-9 (Standard) / CR9EH-9 (For high speed running)
	DENSO	U24FER9 (Standard) / U27FER9 (For high running)
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		8° BTDC at idle

Unit: mm (in)

**ELECTRIC STARTER**

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 - 13.0 (0.47 - 0.51)	4.5 (0.18)

**LIGHTS/METERS/SWITCHES**

LIGHTS/METERS/SWITCHES			
ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12V – 80 W
		Lo	12V – 55 W
	Brake/tail light		12V – 21/5 W X 2
	Turn signal light	Front	12V – 23/8 W X 2
		Rear	12V – 21 W
	License light		12V – 5 W
	Instrument light		12V – 1.7 W X 3
	Turn signal indicator		12V – 1.7 W X 2
	High beam indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	PGM-FI warning indicator		LED
	Fuel reserve indicator		LED
Fuse	Main fuse		30 A
	PGM-FI fuse		20 A
	Sub fuse		20 A X 1, 10A X 4
Tachometer peak voltage			10.5 V minimum
ECT sensor resistation	80 °C		2.1 – 2.6 k $\Omega$
	120 °C		0.62 – 0.76 k $\Omega$

## GENERAL INFORMATION

### TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm hex bolt and nut	5 (0.5, 3.8)	5 mm screw	4 (0.4, 2.9)
6 mm hex bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm hex bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	10 (1.0, 7)
10 mm hex bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
12 mm hex bolt and nut	54 (5.5, 40)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut	26 (2.7, 20)
		10 mm flange bolt and nut	39 (4.0, 29)

- Torque specifications listed below are for important fasteners.
- Others should be tightened to standard torque values listed above.

- NOTES:
1. Apply sealant to the threads.
  2. Apply a locking agent to the threads.
  3. Stake.
  4. Apply oil to the threads and flange surface.
  5. U-nut.
  6. ALOC bolt/screw: replace with a new one.
  7. Apply grease to the threads.
  8. Apply molybdenum disulfide oil to the threads and seating surface.
  9. CT bolt

#### ENGINE

ITEM	QTY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>MAINTENANCE:</b>				
Spark plug	4	10	12 (1.2, 9)	
Timing hole cap	1	46	18 (1.8, 13)	NOTE 7
Engine oil filter cartridge	1	20	26 (2.7, 20)	NOTE 4
Engine oil drain bolt	1	12	29 (3.0, 22)	
<b>LUBRICATION SYSTEM:</b>				
Oil main gallery sealing bolt (20mm)	1	20	29 (3.0, 22)	NOTE 2
Oil pump cover bolt	1	6	8 (0.8, 5.8)	NOTE 9
Oil cooler bolt (filter base)	1	20	64 (6.5, 47)	NOTE 4
<b>FUEL SYSTEM (Programmed Fuel Injection):</b>				
ECT (Engine Coolant Temperature)/thermo sensor	1	12	23 (2.3, 17)	
Throttle body insulator bend screw	8	5	See page 1-14	
Starter valve lock nut	4	10	2 (0.18, 1.3)	
Starter valve cable stay screw	4	3	1 (0.09, 0.7)	
Pressure regulator mounting bolt	2	6	10 (1.0, 7)	
<b>COOLING SYSTEM:</b>				
Water pump cover flange bolt	2	6	12 (1.2, 9)	NOTE 9
<b>ENGINE MOUNTING:</b>				
Drive sprocket special bolt	1	10	54 (5.5, 40)	

ENGINE (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>CYLINDER HEAD/VALVES:</b>				
Cylinder head mounting bolt/washer	10	9	48 (4.9, 35)	NOTE 8
Camshaft holder flange bolt	20	6	12 (1.2, 9)	NOTE 4
Cylinder head cover bolt	6	6	10 (1.0, 7)	
Breather plate flange bolt	3	6	12 (1.2, 9)	NOTE 2, 9
PAIR reed valve cover SH bolt	4	6	12 (1.2, 9)	NOTE 9
Cam sprocket flange bolt	4	7	20 (2.0, 14)	NOTE 2
Cam pulse generator rotor flange bolt	2	6	12 (1.2, 9)	NOTE 2
Cylinder head stud bolt (exhaust pipe stud bolt)	8	8	See page 1-14	
<b>CLUTCH/GEARSHIFT LINKAGE:</b>				
Clutch center lock nut	1	22	128 (13.1, 95)	NOTE 3, 4
Clutch spring bolt	5	6	12 (1.2, 9)	
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 2
Shift drum center socket bolt	1	8	23 (2.3, 17)	NOTE 2
Shift drum stopper arm pivot bolt	1	6	12 (1.2, 9)	
Gearshift spindle return spring pin	1	8	22 (2.2, 16)	
<b>ALTERNATOR/STARTER CLUTCH:</b>				
Alternator stator socket bolt	4	6	12 (1.2, 9)	
Starter clutch outer socket bolt	6	8	16 (1.6, 12)	NOTE 2
Flywheel flange bolt	1	10	103 (10.5, 76)	NOTE 4
Starter wire clamp flange bolt	1	6	10 (1.0, 7)	NOTE 9
<b>CRANKCASE/TRANSMISSION:</b>				
Mainshaft bearing set plate bolt	2	6	12 (1.2, 9)	NOTE 2
Gearshift drum bearing/fork shaft set bolt	2	6	12 (1.2, 9)	NOTE 2
Crankcase bolt (Main journal)	10	9	27 (2.8, 20)	NOTE 8
Crankcase bolt	1	10	39 (4.0, 28)	
Crankcase bolt	14	6	12 (1.2, 9)	
Crankcase bolt	2	8	24 (2.4, 17)	
<b>CRANKSHAFT/PISTON/CYLINDER:</b>				
Connecting rod nut	8	8	34 (3.5, 25)	NOTE 4
<b>IGNITION SYSTEM:</b>				
Ignition pulse generator rotor cover bolt	6	8	10 (1.0, 7)	
Ignition pulse generator rotor special bolt	1	10	59 (6.0, 43)	
<b>ELECTRIC STARTER:</b>				
Starter motor terminal nut	1	6	12 (1.2, 9)	
<b>LIGHTS/METERS/SWITCHES:</b>				
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 1
Oil pressure switch wire terminal bolt/washer	1	4	2 (0.2, 1.4)	
Neutral switch	1	10	12 (1.2, 9)	

## GENERAL INFORMATION

Insulator clamp (Throttle body side):

$7 \pm 1 \text{ mm}$  ( $0.3 \pm 0.04 \text{ in}$ )



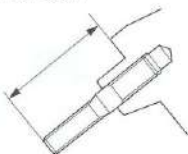
Insulator clamp (Cylinder head side):

$7 \pm 1 \text{ mm}$  ( $0.3 \pm 0.04 \text{ in}$ )



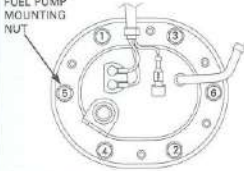
Exhaust pipe stud bolt:

$42.5 \pm 0.5 \text{ mm}$  ( $1.67 \pm 0.02 \text{ in}$ )





## FRAME

FRAME	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
FRAME BODY PANELS/EXHAUST SYSTEM:	Exhaust pipe joint flange nut	8	8	20 (2.0, 14)	
	Exhaust pipe mounting nut	1	8	27 (2.8, 20)	
	Muffler mounting flange bolt	2	8	27 (2.8, 20)	
	Muffler band flange bolt	3	8	27 (2.8, 20)	
FUEL SYSTEM (Programmed Fuel Injection):	Fuel tube banjo bolt (fuel tank side)	1	12	22 (2.2, 16)	
	Fuel tube sealing nut (throttle body side)	1	12	22 (2.2, 16)	
	Fuel pump mounting nut	6	6	12 (1.2, 9)	
FUEL PUMP MOUNTING NUT					
COOLING SYSTEM:	Cooling fan mounting nut	1	5	3 (0.27, 2.0)	NOTE 2
	Fan motor mounting nut	3	5	5 (0.5, 3.6)	
ENGINE MOUNTING:	Front engine hanger bolt/nut	2	10	50 (5.1, 37)	See page 7-10
	Rear upper engine hanger bolt/nut	1	10	50 (5.1, 37)	
	Rear lower engine hanger bolt/nut	1	10	50 (5.1, 37)	
	Gear shift linkage bolt	1	5	20 (2.0, 14)	
FRONT WHEEL/SUSPENSION/STEERING:	Handlebar weight mounting screw	2	6	10 (1.0, 7)	NOTE 6
	Front brake disc bolt	12	6	20 (2.0, 14)	NOTE 6
	Front axle bolt	1	14	59 (6.0, 43)	
	Front axle holder flange bolt	4	8	22 (2.2, 16)	
	Front brake hose clamp flange bolt (left front)	1	6	12 (1.2, 9)	
	Front brake hose clamp flange bolt (right front)	1	6	12 (1.2, 9)	
	Fork socket bolt	2	8	20 (2.0, 14)	NOTE 2
	Fork bolt	2	39	22 (2.2, 16)	
	Fork top bridge pinch socket bolt	2	8	22 (2.2, 16)	
	Fork bottom bridge pinch flange bolt	2	10	39 (4.0, 29)	
	Steering bearing adjusting nut	1	26	25 (2.5, 18)	See page 13-29
	Steering bearing adjusting nut lock nut	1	26	—	
	Steering stem nut	1	24	103 (10.5, 76)	
	Front brake hose clamp bolt (steering stem)	1	6	10 (1.0, 7)	

## GENERAL INFORMATION

FRAME (Cont'd)				
ITEM	QTY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>REAR WHEEL/SUSPENSION:</b>				
Rear brake disc bolt	4	8	42 (4.3, 31)	NOTE 6
Final driven sprocket nut	5	12	108 (11.0, 80)	NOTE 5
Rear axle nut	1	18	93 (9.5, 69)	NOTE 5
Rear shock absorber upper mounting bolt	1	10	42 (4.3, 31)	
Rear shock absorber upper mounting nut	1	10	42 (4.3, 31)	NOTE 5
Drive chain slider flange bolt	2	6	9 (0.9, 6.5)	NOTE 6
Swingarm pivot nut	1	18	93 (9.5, 69)	
<b>HYDRAULIC BRAKE:</b>				
Front master cylinder reservoir cap screw	2	4	1 (0.1, 0.7)	
Front brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Front brake lever pivot nut	1	6	6 (0.6, 4.3)	
Front brake light switch screw	1	4	1 (0.1, 0.7)	
Front master cylinder mounting bolt	2	6	12 (1.2, 9)	
Front brake caliper assembly torx bolt	8	8	32 (3.3, 24)	NOTE 2
Front brake caliper mounting flange bolt	4	8	30 (3.1, 22)	NOTE 6
Rear master cylinder push rod lock nut	1	8	17 (1.7, 12)	
Rear master cylinder mounting bolt	2	6	10 (1.0, 7)	
Rear brake caliper bracket bolt	1	8	23 (2.3, 17)	
Rear brake caliper pin bolt	1	12	27 (2.8, 20)	
Pad pin	3	10	17 (1.7, 12)	
Pad pin plug	1	10	3 (0.3, 2.2)	
Brake hose oil bolt	3	10	34 (3.5, 25)	
Brake caliper bleeder valve	3	8	6 (0.6, 4.3)	
Step holder mounting bolt	4	8	27 (2.8, 20)	
Rear master cylinder hose joint screw	2	6	10 (1.0, 7)	
<b>LIGHTS/METERS/SWITCHES:</b>				
Side stand switch bolt	1	8	10 (1.0, 7)	NOTE 6
Ignition switch mounting bolt	2	8	25 (2.5, 18)	
Fan motor switch	1	16	18 (1.8, 13)	NOTE 1
<b>OTHERS:</b>				
Side stand pivot bolt	1	10	10 (1.0, 7)	
Side stand pivot lock nut	1	10	39 (4.0, 29)	

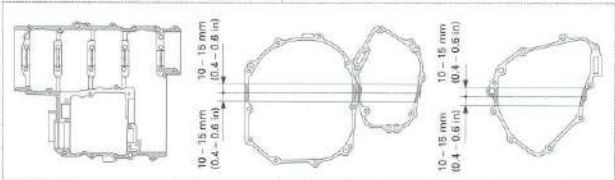



## TOOLS

- NOTES: 1. Equivalent commercially available.  
 2. Alternative tool.  
 3. Newly designed tool.  
 4. Not available in U.S.A

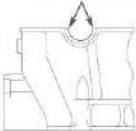
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Fuel pressure gauge	07406-0040003	NOTE 2: 07406-0040002	5
Oil pressure gauge set	07506-3000000	NOTE 1	4
Oil pressure gauge attachment	07510-MJ10100	NOTE 1	4
Clutch center holder	07724-0050002	NOTE 1	9
Flywheel holder	07725-0040000	NOTE 1	10
Rotor puller	07733-0020001	NOTE 2: 07933-3990000	10
Attachment, 32 X 35 mm	07746-0010100		9, 14
Attachment, 37 X 40 mm	07746-0010200		9, 14
Attachment, 42 X 47 mm	07746-0010300		13, 14
Attachment, 52 X 55 mm	07746-0010400		14
Attachment, 28 X 30 mm	07746-1870100		14
Attachment, 22 X 24 mm	07746-0010800		14
Inner driver C	07746-0030100		11
Attachment, 25 mm I.D.	07746-0030200		12
Outer driver, 37mm	07ZMD-MBW0200		14
Pilot, 17 mm	07746-0040400		9, 14
Pilot, 20 mm	07746-0040500		13, 14
Pilot, 35 mm	07746-0040800		9
Pilot, 28 mm	07746-0041100		14
Bearing remover shaft	07GGD-0010100		13, 14
Bearing remover head, 20 mm	07746-0050600		13, 14
Driver	07749-0010000		9, 13, 14
Valve spring compressor	07757-0010000		8
Valve seat cutter		NOTE 1	8
Seat cutter, 27.5 mm (45° IN/EX)	07780-0010200		
Flat cutter, 27 mm (32° EX)	07780-0013300		
Flat cutter, 30 mm (32° IN)	07780-0012200		
Interior cutter, 24 mm (80° IN/EX)	07780-0010600		
Cutter holder, 4.5 mm	07781-0010600		
Snap ring pliers	07914-SA50001		15
Steering stem socket	07916-3710101	NOTE 2: 07916-3710100	13
Ball race remover set	07953-MJ10000		13
Attachment, 40 mm	07953-MJ10100		
Driver shaft	07953-MJ10200		
Ball race remover, 40 x 245L	07953-4250002		
Ball race remover, 44.5 mm	07946-3710500		
Steering stem driver	07946-M500000		13
Fork seal driver weight	07947-KA50100		13
Fork seal driver attachment	07946-KA40200		13
Valve spring compressor attachment	07953-KM30101		8
Oil filter wrench	07HAA-PJ70100		3
Peak voltage adaptor	07HGJ-0020100	NOTE 2 NOTE 3: Peak voltage tester (U.S.A. only)	9, 17, 19 8
Tappet hole protector	07HMG-MR70002		
Drive chain tool set	07HMH-MR10103	NOTE 3: 07HMH-MR1010B or 07HMH-MR1010C (U.S.A. only)	3
Valve guide driver	07HMD-ML00101		8
Valve guide reamer, 4.508 mm	07HMH-ML00101		8
Compression gauge attachment	07RMJ-MY50100	NOTE 1	8
Inspection adaptor	07XMZ-MBW0101		20
ECM test harness	07YVZ-0010100	Two required	5
Valve guide driver	07743-0020000		8
Driver shaft B	07964-MB00200		12
Christie battery charger	MC1012/2	U.S.A. only	17

## GENERAL INFORMATION

### LUBRICATION & SEAL POINTS

ENGINE	LOCATION	MATERIAL	REMARKS
	<p>Crankcase mating surface</p> 	<p>Liquid sealant (Three Bond 1207B or equivalent)</p>	
<p>Oil pan mating surface</p>  <p>Oil pressure switch threads</p> <p>Do not apply sealant to the thread head 3 - 4 mm (0.1 - 0.2 in).</p>  <p>Ignition pulse generator cover bolt threads</p> <p>Apply sealant to the thread head 6.5 ± 1 mm</p> <p>Marked "Δ"</p> 			

## ENGINE (Cont'd)

LOCATION	MATERIAL	REMARKS
Ignition pulse generator grommet ECT (engine coolant temperature sensor) threads Cam pulse generator rotor bolt threads Lower crankcase sealing bolt threads Cylinder head sealing bolt threads AC generator bolt threads Cylinder head semi-circular cut-out  APPLIED POSITION 	Sealant	Crankcase mating surface Coating width: $6.5 \pm 1$ mm
Main journal bearing surface Piston pin sliding surface Connecting rod bearing surface Connecting rod small end inner surface Crankshaft thrust surface Camshaft lobes/journals and thrust surface Valve stem (valve guide sliding surface) Valve lifter outer sliding surface Clutch outer/primary driven gear sliding surface Clutch outer guide sliding surface M3/4, C5, C6 shifter gear (shift fork grooves) Starter reduction gear shaft outer surface	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Piston ring sliding area Oil strainer packing Clutch disc surface Starter one-way clutch sliding surface Connecting rod nut threads Flywheel bolt threads and seating surface Main journal 6 mm bolt threads and seating surface (after removing anti-rust oil additive) Clutch center lock nut threads Oil filter cartridge threads and O-ring Camshaft holder bolt threads and seating surface Cam chain tensioner, tensioner collar seating surface Oil cooler center bolt threads Each gear tooth and rotating surface Each bearing Each O-ring Other rotating area and sliding surface	Engine oil	

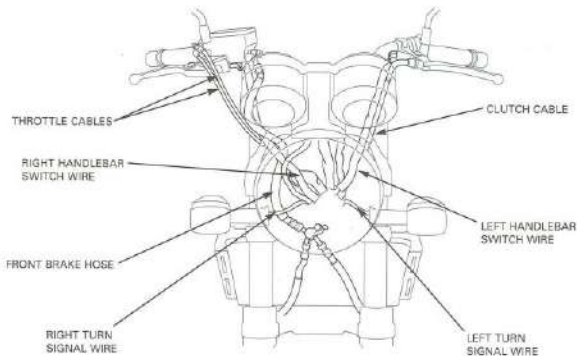
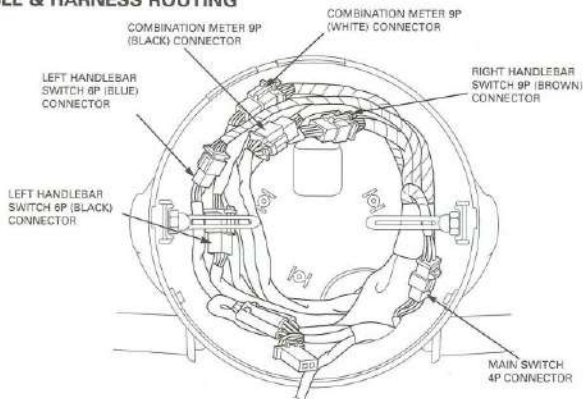
## GENERAL INFORMATION

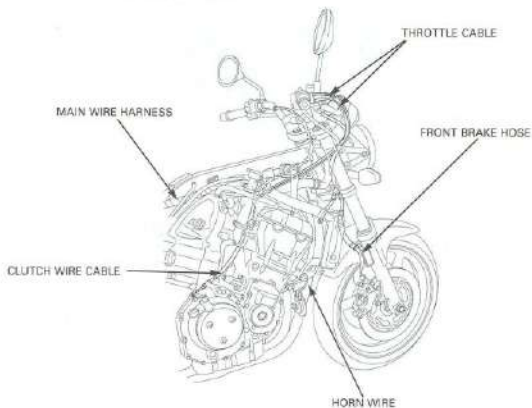
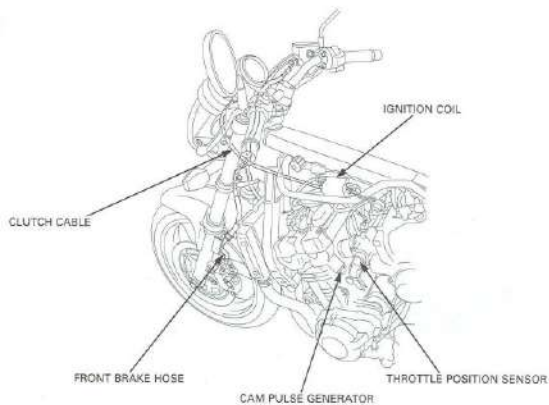
ENGINE (Cont'd)		
LOCATION	MATERIAL	REMARKS
Timing hole cap threads Each oil seal lip	Multi-purpose grease	
Lower crankcase sealing bolt threads Cylinder head cover breather plate bolt threads Cam pulse generator rotor bolt threads Starter one-way clutch outer bolt threads Oil pump driven sprocket bolt threads Shift drum bearing set plate bolt threads Mainshaft bearing set plate bolt threads Cam sprocket bolt threads Shift drum center bolt threads Spindle plate tightening bolt threads Oil filter boss threads	Locking agent	Coating width: $6.5 \pm 1$ mm

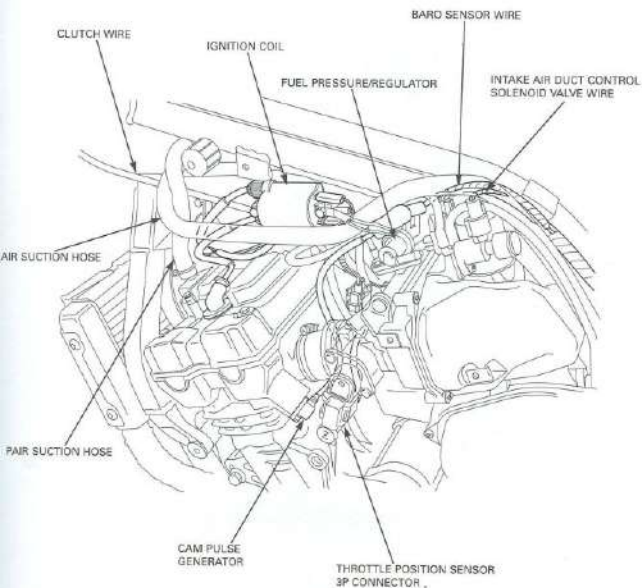
FRAME	LOCATION	MATERIAL	REMARKS
Seat catch hook sliding area Front wheel dust seal lips Rear wheel dust seal lips Clutch lever pivot bolt sliding area Rear brake pedal pivot sliding area Gearshift pedal pivot Side stand pivot Steering head bearing sliding surface Steering head dust seal lips Swingarm pivot bearings Swingarm pivot dust seal lips Shock absorber needle bearings Shock absorber dust seal lips		Multi-purpose grease	
Throttle cable A, B outer inside Clutch cable outer inside		Cable lubricant	
Handlebar grip rubber inside		Honda bond A, Honda Hand Grip Cement (U.S.A. only or equivalent)	
Steering bearing adjustment nut threads		Engine oil	
Front brake lever-to-master piston contacting area Front brake lever pivot Rear master brake master piston-to-push rod contacting area Brake caliper dust seals Rear brake caliper boot inside Rear brake caliper pin boot inside		Silicone grease	
Brake master piston and cups Brake caliper piston and piston seals		DOT 4 brake fluid	
Fork cap O-ring Fork dust seal and oil seal lips		Pro Honda Suspension Fluid SS-8	
Rear brake reservoir hose joint screw threads Front brake caliper assembly bolt threads Rear brake caliper pin bolt threads Front fork socket bolt threads		Locking agent	

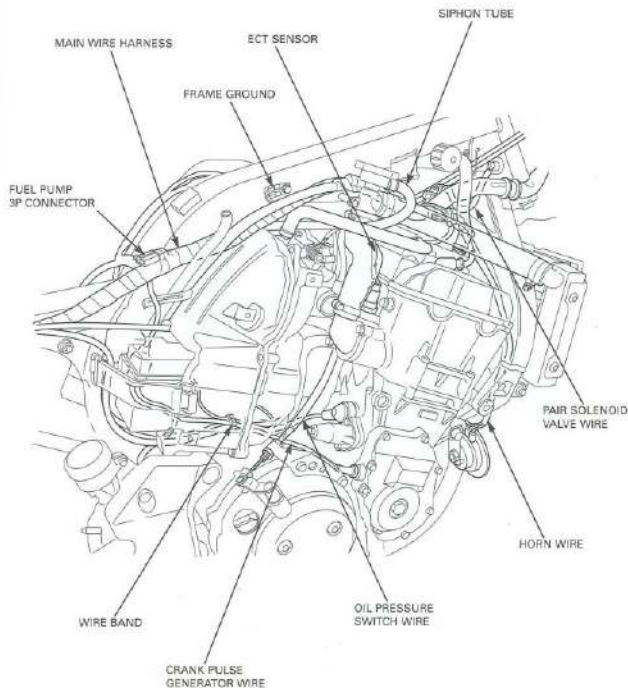


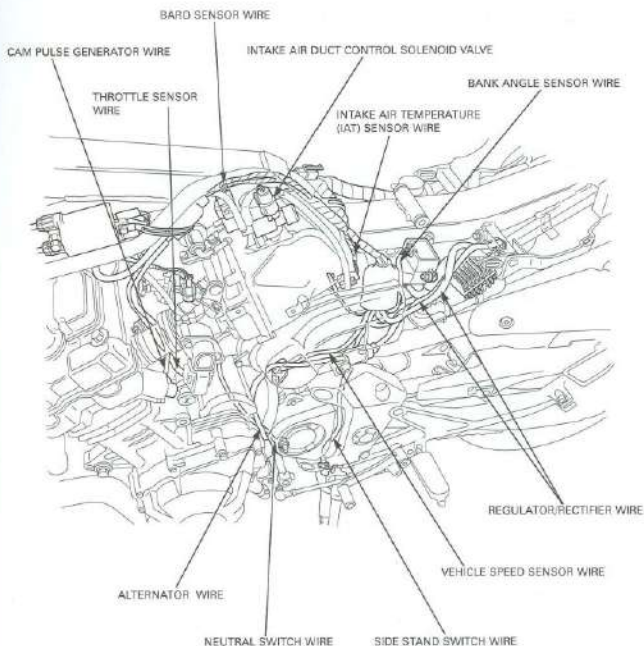
## CABLE & HARNESS ROUTING

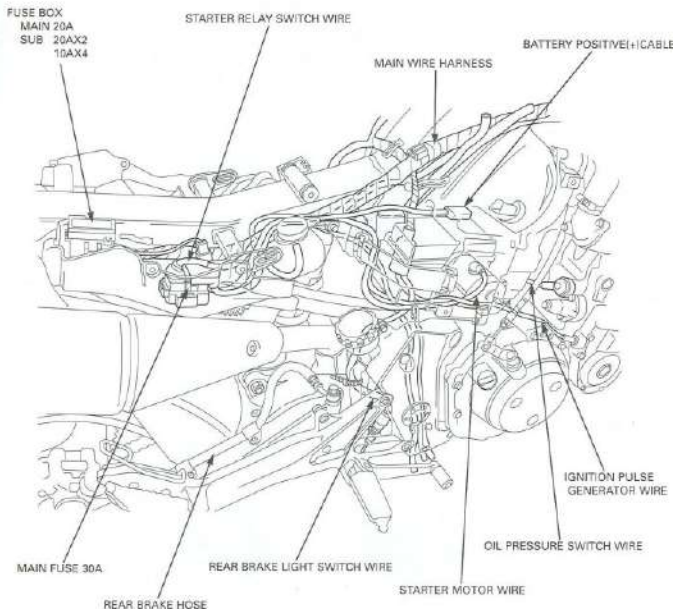


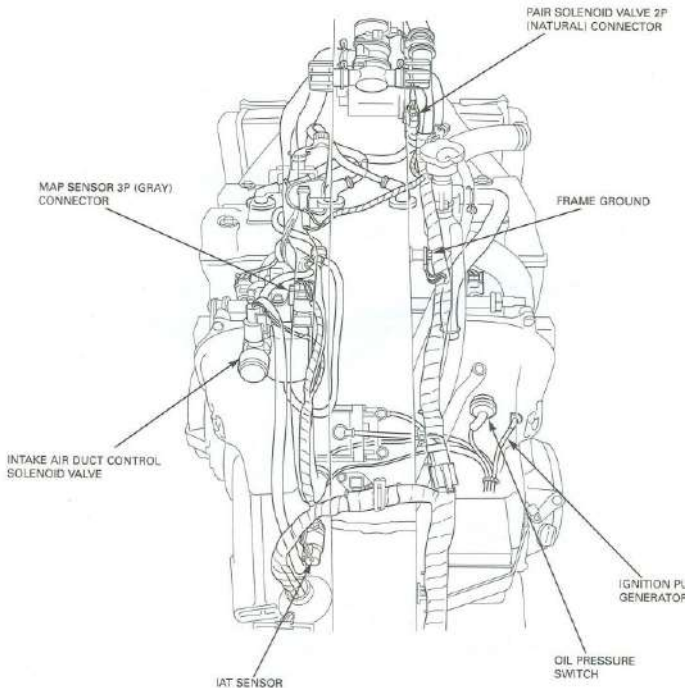




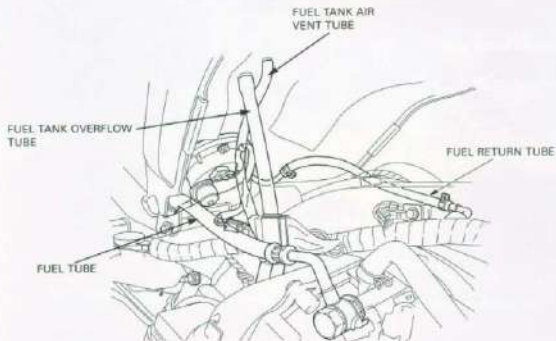
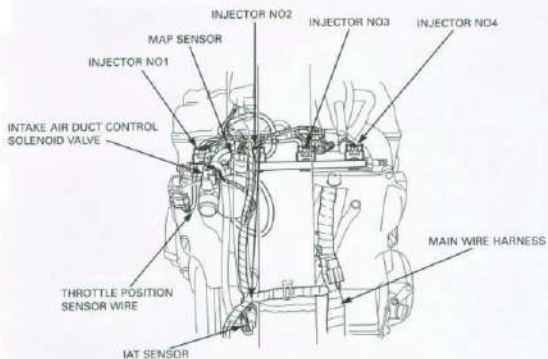


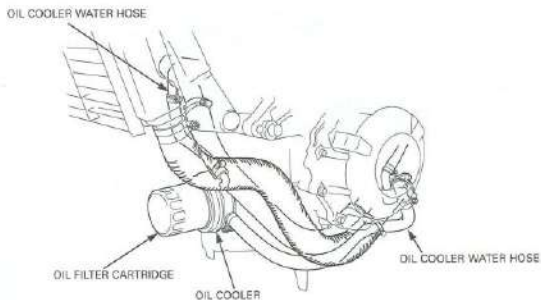
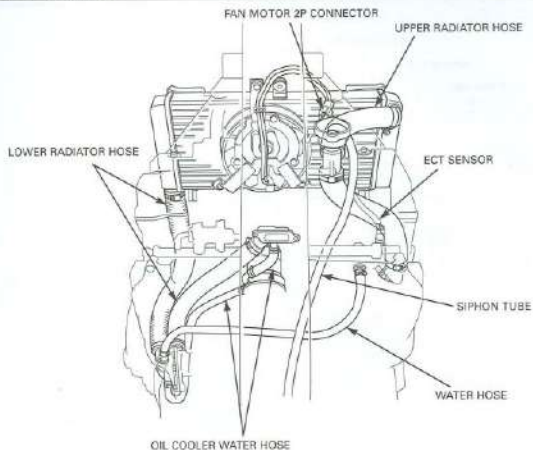


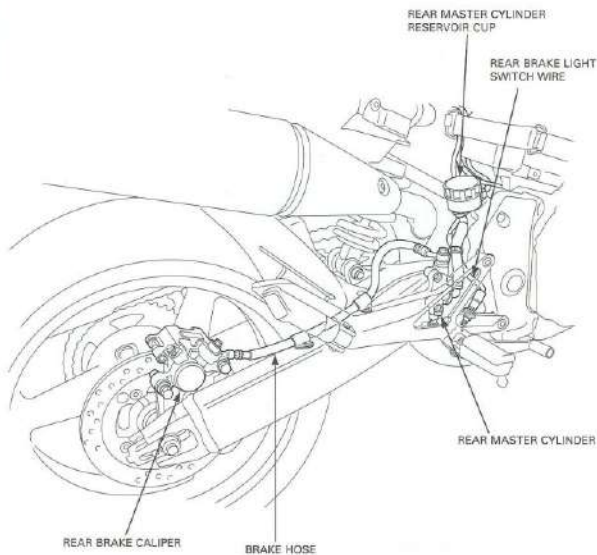


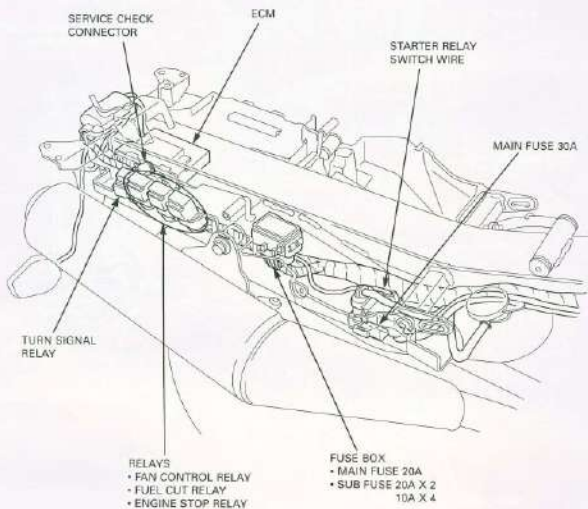




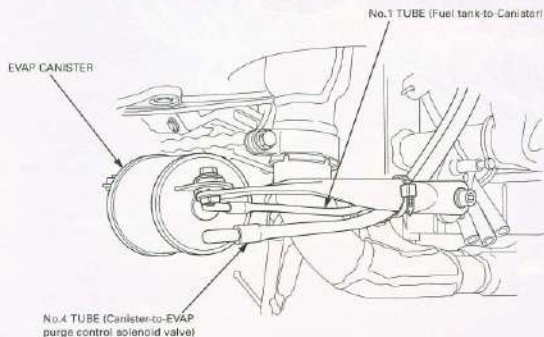
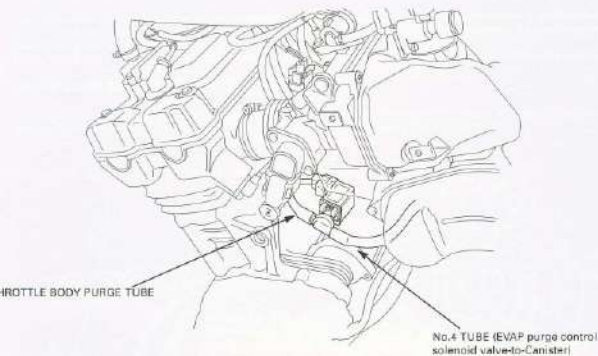








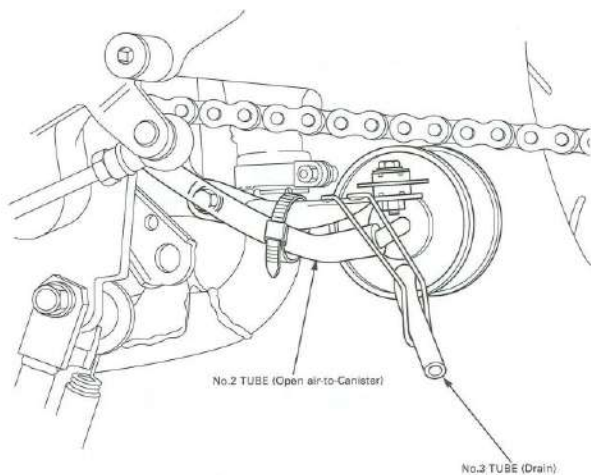
California type only



## GENERAL INFORMATION

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California type only



## EMISSION CONTROL SYSTEMS

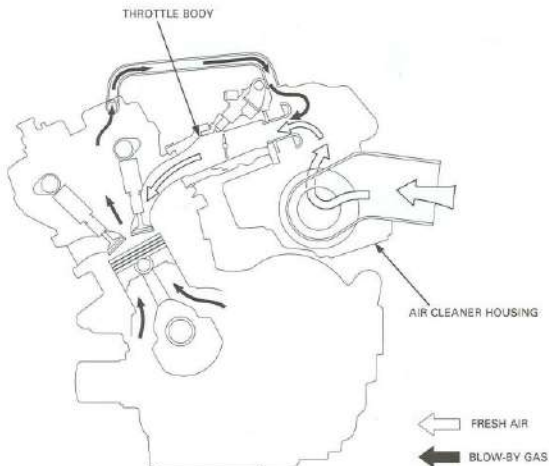
### SOURCE OF EMISSIONS

The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes lean injection settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

### CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and throttle body.



## GENERAL INFORMATION

### EXHAUST EMISSION CONTROL SYSTEM (SECONDARY AIR SUPPLY SYSTEM)

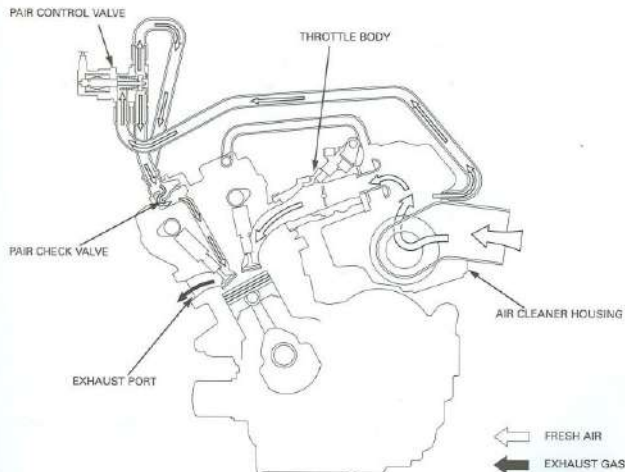
The exhaust emission control system is composed of a lean fuel injection setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crankcase emission control system.

The exhaust emission control system consists of a secondary air supply system that introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the PAIR (Pulse Secondary Air Injection) control valve.

This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

The reed valve prevents reverse air flow through the system. The PAIR control valve is operated by the solenoid valve. The solenoid valve is controlled by the PGM-FI unit, and the fresh air passage is opened/closed according to the running condition (ECT/IAT/TP/MAP sensor and engine revolution).

No adjustments to the secondary air supply system should be made, although periodic inspection of the components is recommended.

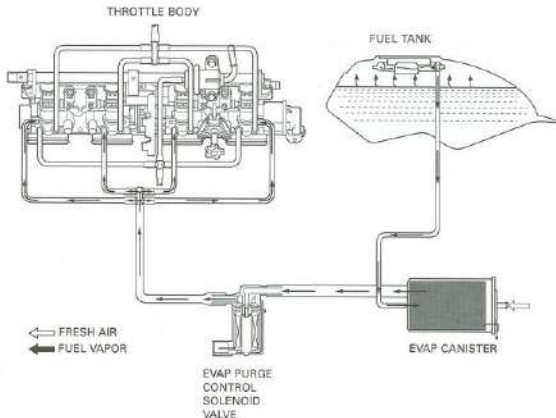




## EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)

This model complies with California Air Resources Board evaporative emission requirements.

Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is absorbed and stored while the engine is stopped. When the engine is running and the evaporative emission (EVAP) purge control solenoid valve is open, fuel vapor in the EVAP canister is drawn into the engine through the throttle body.



## NOISE EMISSION CONTROL SYSTEM

**TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED:** Local law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

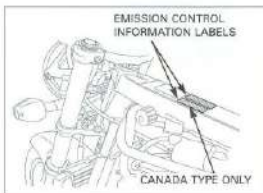
**AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:**

1. Removal of, or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

## EMISSION CONTROL INFORMATION LABELS (U.S.A. ONLY)

An Emission Control Information Label is located on the main frame as shown. It gives base tune-up specifications.

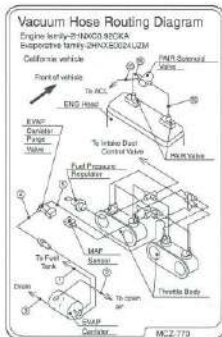
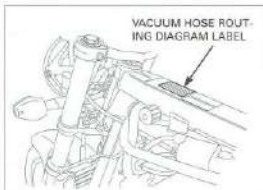
The fuel tank must be lifted up to read it. Refer to page 3-15 for fuel tank opening.



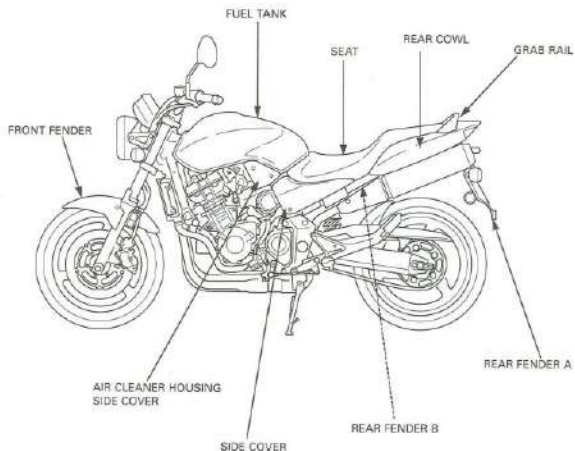
## VACUUM HOSE ROUTING DIAGRAM LABEL (CALIFORNIA TYPE ONLY)

The Vacuum Hose Routing Diagram Label is on the main frame as shown.

The fuel tank must be lifted up to read it. Refer to page 3-15 for fuel tank opening.



## BODY PANEL LOCATIONS



# 2. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS	2-0	REAR COWL	2-3
SERVICE INFORMATION	2-1	FRONT FENDER	2-3
TROUBLESHOOTING	2-1	REAR FENDER A	2-4
SEAT	2-2	REAR FENDER B	2-4
SIDE COVER	2-2	MUFFLER/EXHAUST PIPE	2-5
AIR CLEANER HOUSING SIDE COVER	2-2		

## SERVICE INFORMATION

### GENERAL

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- This section covers removal and installation of the body panels and exhaust system.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
- Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.

### TORQUE VALUES

Exhaust pipe joint flange nut	20 N·m (2.0 kgf·m, 14 lbf·ft)
Exhaust pipe mounting bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)
Exhaust pipe band bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)
Muffler band flange bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)
Muffler mounting bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)

## TROUBLESHOOTING

### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

### Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

## SEAT

### REMOVAL

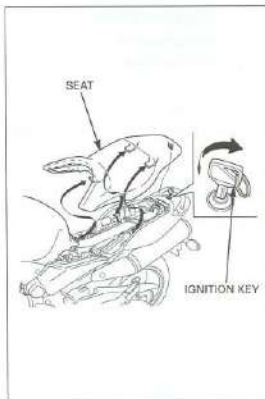
Unhook the seat with the ignition key.

Pull the seat back and remove it.

### INSTALLATION

Align the seat hooks with the frame hooks and push the seat forward.

Push the seat down until it locks.



## SIDE COVER

### REMOVAL

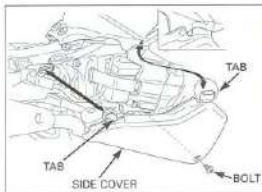
Remove the seat (page 2-21).

Remove the side cover bolt.

Remove the front tab from the fuel tank and remove the rear tab from the grommet of the frame.

Remove the side cover.

Installation is in the reverse order of removal.



## AIR CLEANER HOUSING SIDE COVER

### REMOVAL/INSTALLATION

Remove the socket bolts and air cleaner housing side cover.

Installation is in the reverse order of removal.



## REAR COWL

### REMOVAL/INSTALLATION

Remove the seat and side cover (page 2-2).

Remove the tail/brake light 3P connector.

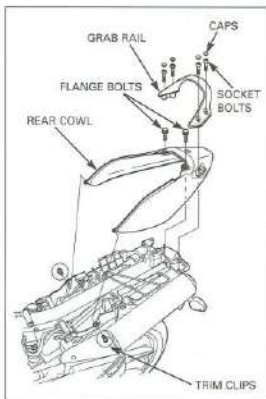
Remove the caps from the socket bolts.

Remove the four socket bolts and grab rail.

Remove the two trim clips and socket bolts.

Remove the rear cowl by pulling it back.

Installation is in the reverse order of removal.



## FRONT FENDER

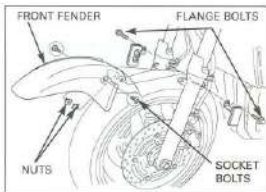
### REMOVAL/INSTALLATION

Remove the brake hose clamp bolts and reflectors.

Remove the front fender mounting socket bolts/nuts and flange bolts.

Remove the front fender.

Installation is in the reverse order of removal.



## REAR FENDER A

### REMOVAL/INSTALLATION

Remove the rear cowl (page 2-3).

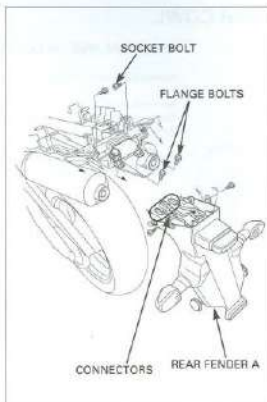
Remove the following:

- R/L turn signal light 2P connector.
- License light 2P connector.

Remove the socket bolts/nuts and flange bolts.

Remove the rear fender A.

Installation is in the reverse order of removal.



## REAR FENDER B

### REMOVAL/INSTALLATION

Remove the rear fender A (see upper).

Remove the following:

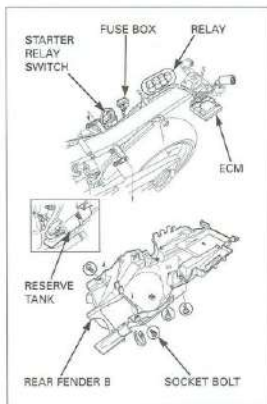
- Rear shock absorber reserve tank
- Starter relay switch
- Fuse box
- Fan control relay
- Fuel cut relay
- Engine stop relay
- Turn signal relay
- PGM-FI/IGN unit/Engine control module(ECM)

*Do not let the  
PGM-FI/IGN  
unit/Engine con-  
trol module(ECM)  
hang free.*

Remove the socket bolts and flange bolts.

Remove the rear fender B from the frame.

Installation is in the reverse order of removal.



## MUFFLER/EXHAUST PIPE

### MUFFLER

#### REMOVAL

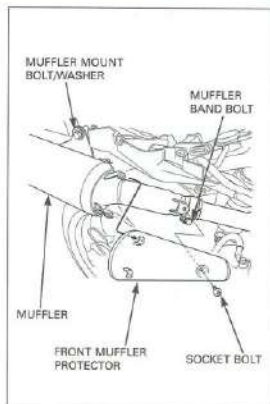
Remove the rear cowl (page 2-3).

Remove the socket bolt and remove the front muffler protector by pulling it forward.

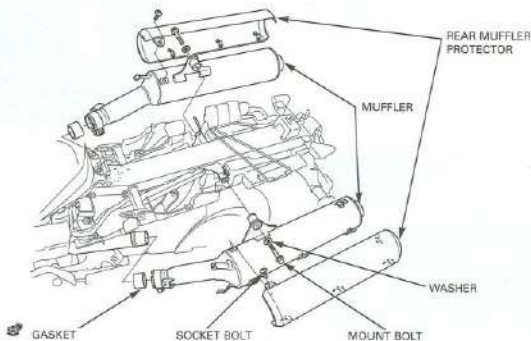
Loosen the muffler band bolt.

Remove the muffler mounting bolt and washer.

Remove the muffler.



#### DISASSEMBLY/ASSEMBLY





## INSTALLATION

*Make sure the clearance of the muffler protector and rear fender B is equal on both sides.*

Install the muffler and loosely tighten the muffler mounting bolts/washer.

Tighten the muffler mounting bolts first, then tighten the muffler band bolts to the specified torque.

### TORQUE:

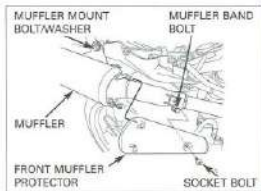
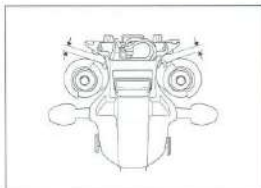
Muffler mounting bolt: 27 N·m (2.8 kgf·m, 20 lbf·ft)

Muffler band bolt: 27 N·m (2.8 kgf·m, 20 lbf·ft)

Recheck the clearance of the muffler and protector.

Install the front muffler protector and tighten the socket bolt securely.

Install the rear cowl (page 2-3).



*If you remove the exhaust joint pipe, remove the swingarm (refer to section 34).*

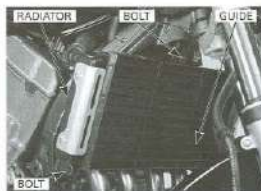
## EXHAUST PIPE

### REMOVAL

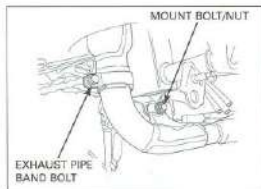
Remove the muffler (page 2-5).

Remove the two radiator mounting bolts.  
Remove the radiator guide from the frame and move the radiator forward.

*Do not damage the water hoses.*



Loosen the exhaust pipe band bolt and exhaust pipe mounting bolts/nuts.



*Do not damage the swingarm by the exhaust joint pipe when removing the exhaust pipe.*

Remove the exhaust pipe joint nuts, exhaust pipe mounting bolt, washer and nut.

Remove the exhaust pipe and gaskets.

## INSTALLATION

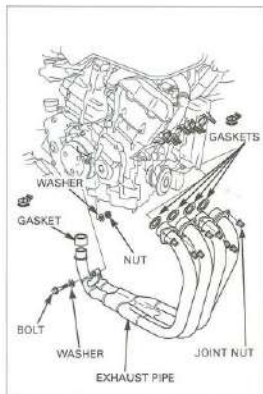
Install the new exhaust pipe gaskets and exhaust joint pipe gasket.

Install the exhaust pipe and loosely tighten the exhaust pipe joint nuts, exhaust pipe mounting bolts, washers and nuts.

Install the muffler (page 2-6).

*Always replace the exhaust pipe gaskets with new ones.*

*Do not damage the swingarm by the exhaust joint pipe when installing the exhaust pipe.*

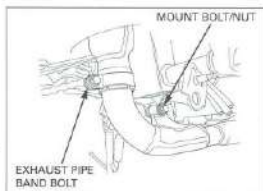


Tighten the bolt/nut to the specified torque as follows.

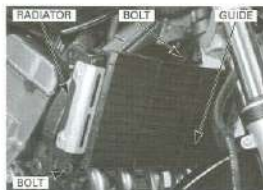
### TORQUE:

1. Exhaust pipe joint nut:  
20 N·m (2.0 kgf·m, 14 lbf·ft)
2. Exhaust pipe band bolt:  
27 N·m (2.8 kgf·m, 20 lbf·ft)
3. Exhaust pipe mount bolt/nut:  
27 N·m (2.8 kgf·m, 20 lbf·ft)

Recheck the clearance of the muffler and protector (page 2-6).



Install the radiator to the frame.  
Install and tighten the radiator mounting bolts securely.



# 3. MAINTENANCE

SERVICE INFORMATION	3-1	DRIVE CHAIN	3-16
MAINTENANCE SCHEDULE	3-3	DRIVE CHAIN SLIDER	3-20
FUEL LINE	3-4	BRAKE FLUID	3-20
THROTTLE OPERATION	3-4	BRAKE PAD WEAR	3-21
CHOKE OPERATION	3-5	BRAKE SYSTEM	3-21
AIR CLEANER	3-5	BRAKE LIGHT SWITCH	3-22
CRANKCASE BREATHER	3-6	HEADLIGHT AIM	3-22
SPARK PLUG	3-6	CLUTCH SYSTEM	3-23
VALVE CLEARANCE	3-7	SIDE STAND	3-24
ENGINE OIL/OIL FILTER	3-12	SUSPENSION	3-24
ENGINE IDLE SPEED	3-13	NUTS, BOLTS, FASTENERS	3-25
RADIATOR COOLANT	3-13	WHEELS/TIRES	3-25
COOLING SYSTEM	3-14	STEERING HEAD BEARINGS	3-26
SECONDARY AIR SUPPLY SYSTEM	3-15		
EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	3-15		

## SERVICE INFORMATION

### GENERAL

- Place the motorcycle on a level ground before starting any work.
- Gasoline is extremely flammable and is explosive under certain conditions.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.
- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

## MAINTENANCE

### SPECIFICATIONS

ITEM		SPECIFICATIONS	
Throttle grip free play		2 – 4 mm (1/16 – 3/16 in)	
Spark plug	NGK	CR8EH-9 (STANDARD)	CR9EH-9 (HIGH SPEED)
	DENSO	U24FER9 (STANDARD)	U27FER9 (HIGH SPEED)
Spark plug gap		0.80 – 0.90 mm (0.03 – 0.04 in)	
Valve clearance	IN	0.16 ± 0.03 mm (0.006 ± 0.001 in)	
	EX	0.25 ± 0.03 mm (0.010 ± 0.001 in)	
Engine oil capacity	After draining	3.5 liter (3.7 US qt, 3.1 imp qt)	
	After draining/oil filter change	3.6 liter (3.8 US qt, 3.2 imp qt)	
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (USA & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil API service classification SG or Higher except oils labeled as energy conserving on the API service label. JASO T903 standard MA. Viscosity: SAE 10W-40	
Engine idle speed		1,200 ± 100 ml/min <sup>1</sup> (rpm)	
Drive chain slack		30 – 40 mm (1.2 – 1.6 in)	
Recommended brake fluid		DOT 4	
Clutch lever free play		10 – 20 mm (3/8 – 13/16 in)	
Tire size	Front	120/70 ZR 17 (58W), 120/70 ZR 17M/C (58W)	
	Rear	180/55 ZR 17 (73W), 180/55 ZR 17 M/C (73W)	
Tire brand	Bridgestone	Front	BT56F RADIAL N
		Rear	BT56R RADIAL G
	Michelin	Front	TX15
		Rear	TX25
Tire air pressure	Driver only	Front	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
		Rear	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
	Driver and passenger	Front	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
		Rear	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
Minimum tire tread depth	Front	1.5 mm (0.06 in)	
	Rear	2.0 mm (0.08 in)	

### TORQUE VALUES

Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads
Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply clean engine oil to the O-ring
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Driven sprocket nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	

### TOOLS

Oil filter wrench	07HAA-PJ70100
Drive chain tool set	07HMH-MR10103

# MAINTENANCE SCHEDULE

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean, R: Replace, A: Adjust, L: Lubricate.

The following items require some mechanical knowledge. Certain items (particularly those marked \* and \*\*) may require more technical information and tools. Consult their authorized Honda dealer.

ITEM	FREQUENCY	WHICHEVER COMES FIRST NOTE	ODOMETER READING (NOTE 1)								REFER TO PAGE
			X1,000 mi	0.6	4	8	12	16	20	24	
			X1,000 km	10	64	128	192	256	320	384	
EMISSION RELATED ITEMS	* FUEL LINE					I		I		I	3-4
	* THROTTLE OPERATION					I		I		I	3-4
	* CHOKE OPERATION					I		I		I	3-5
	AIR CLEANER	NOTE 2						C		C	3-5
	CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	C	3-6
	SPARK PLUG					R		R		R	3-6
	* VALVE CLEARANCE							I			3-7
	ENGINE OIL			R		R		R		R	3-12
	ENGINE OIL FILTER			R		R		R		R	3-12
	* ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-13
	RADIATOR COOLANT	NOTE 5				I		I		R	3-13
	* COOLING SYSTEM					I		I		I	3-14
	* SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-15
	* EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4					I			I	
NON-EMISSION RELATED ITEMS	DRIVE CHAIN				EVERY 500 mi (800 km) I, L						3-15
	BRAKE FLUID	NOTE 5			I	I	R	I	I	R	3-20
	BRAKE PAD WEAR				I	I	I	I	I	I	3-20
	BRAKE SYSTEM			I		I		I		I	3-21
	* BRAKE LIGHT SWITCH					I		I		I	3-22
	* HEADLIGHT AIM					I		I		I	3-22
	CLUTCH SYSTEM			I	I	I	I	I	I	I	3-22
	SIDE STAND					I		I		I	3-23
	* SUSPENSION					I		I		I	3-24
	* NUTS, BOLTS, FASTENERS			I		I		I		I	3-24
	** WHEELS/TIRES					I		I		I	3-25
	** STEERING HEAD BEARINGS			I		I		I		I	3-25

\* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and service data and is mechanically qualified.

\*\* In the interest of safety, we recommend these items be serviced only by an authorized Honda dealer.

NOTES: 1. At higher odometer readings, repeat at the frequency interval established here.

2. Service more frequently if the motorcycle is ridden in unusually wet or dusty areas.

3. Service more frequently if the motorcycle is ridden often at full throttle or in the rain.

4. California type only.

5. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

### FUEL LINE

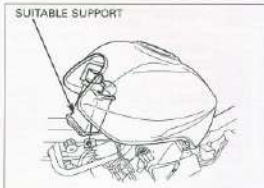
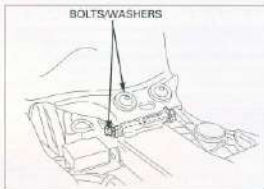
Remove the side covers (page 2-2).

Loosen the fuel tank mounting bolt/nut.

Move the fuel tank back.

*Do not remove  
the maintenance  
wire.*

Open and support the front end of the fuel tank using a suitable support as shown.



Check the fuel lines for deterioration, damage or leakage. Replace the fuel line if necessary.

Install the fuel tank in the reverse order of removal.



### THROTTLE OPERATION

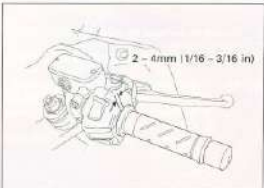
Check for smooth throttle grip full opening and automatic full closing in all steering positions.

Check the throttle cables and replace them if they are deteriorated, kinked or damaged.

Lubricate the throttle cables, if throttle operation is not smooth.

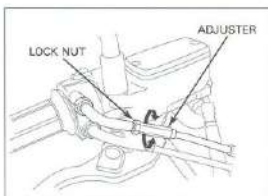
Measure the free play at the throttle grip flange.

**FREE PLAY:** 2 – 4 mm (1/16 – 1/8 in)



Throttle grip free play can be adjusted at either end of the throttle cable.

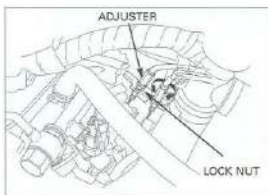
Minor adjustments are made with the upper adjuster. Adjust the free play by loosening the lock nut and turning the adjuster.



Major adjustments are made with the lower adjuster.

Open and support the front end of the fuel tank (page 3-4).

Adjust the free play by loosening the lock nut and turning the adjuster.  
After adjustment, tighten the lock nut securely.  
Recheck the throttle operation.  
Replace any damaged parts, if necessary.



## CHOKE OPERATION

Check for smooth opening and closing of the choke knob.  
Check the choke cable and replace them if they are deteriorated, kinked or damaged.

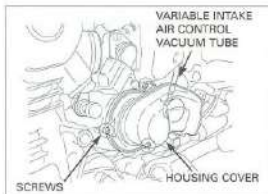
Lubricate the choke cable, if throttle operation is not smooth.



## AIR CLEANER

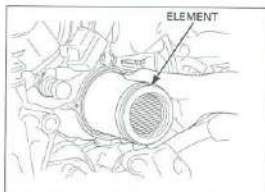
Remove the left side cover (page 2-2).

Disconnect the variable intake air control vacuum tube from the air cleaner housing cover.  
Remove the screws and air cleaner housing cover.  
Remove and check the air cleaner element in accordance with the maintenance schedule (page 3-3).



Clean the air cleaner element using compressed air anytime it is excessively dirty or damaged.

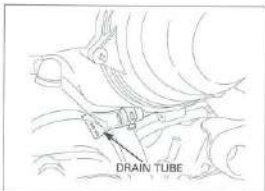
Install the removed parts in the reverse order of removal.



## CRANKCASE BREATHER

Remove the side cover (page 2-2).

Disconnect and clean the drain tube.  
Connect the drain tube.



## SPARK PLUG

### REMOVAL

*Clean around the spark plug bases with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.*

Open and support the front end of the fuel tank (page 3-4).  
Remove the radiator from the frame boes by moving it to the right, then move the radiator forward (page 2-6).  
Disconnect the ignition coil connectors.  
Remove the spark plug using a spark plug wrench or an equivalent tool.

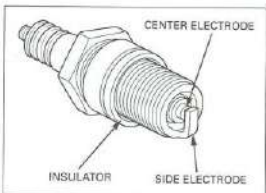
Inspect or replace as described in the maintenance schedule.



### INSPECTION

Check the following and replace if necessary (recommended spark plug: page 3-2)

- Insulator for damage
- Electrodes for wear
- Burning condition, coloration





## REUSING A SPARK PLUG

Clean the spark plug electrodes with a wire brush or spark plug cleaner.

Check the gap between the center and side electrodes with a wire-type feeler gauge.

If necessary, adjust the gap by bending the side electrodes carefully.

**SPARK PLUG GAP: 0.8 – 0.9 mm (0.03 – 0.04 in)**

Reinstall the spark plugs in the cylinder head and hand tighten, then torque to specification.

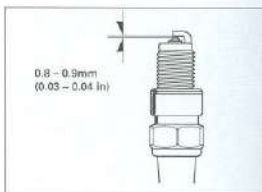
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

## REPLACING A SPARK PLUG

Set the plug to specification with a wire-type feeler gauge (see above).

Install and hand tighten the new spark plug, then tighten it about 1/2 turn after the sealing washer contacts the seat of the plug hole.

Install the radiator onto the frame boss (page 2-6).



## VALVE CLEARANCE

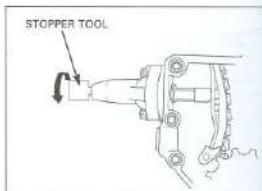
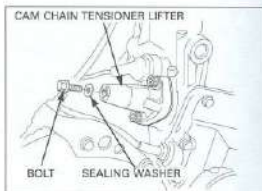
### INSPECTION

Open and support the front end of the fuel tank (page 3-4).

Remove the cylinder head cover (page 8-4).

Remove the cam chain tensioner lifter sealing bolt and sealing washer.

Turn the cam chain tensioner lifter shaft fully and secure it using the tensioner stopper tool (Refer to page 8-7).



Inspect and adjust the valve clearance while the engine is cold (below 35°C/95°F).

Remove the timing hole cap and O-ring.



Turn the crankshaft clockwise, align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



The timing marks ("IN" and "EX") on the cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks on the cam sprocket facing inward, turn the crankshaft clockwise one full turn (360°) and realign the timing marks with the cylinder head surface so they are facing outward.



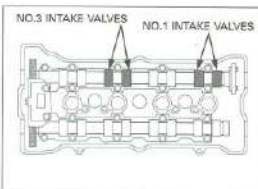
*Record the clearance for each valve for reference in adjustment if adjustment is required.*

Insert the feeler gauge between the valve lifter and the cam lobe.

Check the valve clearance for the No.1 and No.3 cylinder intake valves using a feeler gauge.

### VALVE CLEARANCE:

IN:  $0.16 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)



Turn the crankshaft clockwise 1/2 turn (180°), align the index line on the ignition pulse generator rotor so that it is facing up as shown.

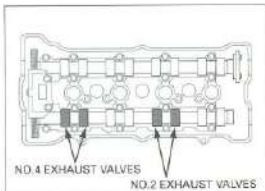


*Record the clearance for each valve for reference in shim selection if adjustment is required.*

Check the valve clearance for the No.2 and No.4 cylinder exhaust valves using a feeler gauge.

**VALVE CLEARANCE:**

**EX:**  $0.25 \pm 0.03$  mm ( $0.010 \pm 0.001$  in)



Turn the crankshaft clockwise 1/2 turn (180°), align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.

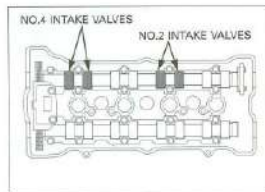


*Record the clearance for each valve for reference in shim selection if adjustment is required.*

Check the valve clearance for the No.2 and No.4 cylinder intake valves using a feeler gauge.

**VALVE CLEARANCE:**

**IN:**  $0.16 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)



Turn the crankshaft clockwise 1/2 turn (180°), align the index line on the ignition pulse generator rotor so that it is facing up as shown.

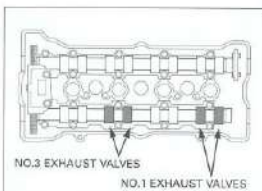


*Record the clearance for each valve for reference in shim selection if adjustment is required.*

Check the valve clearance for the No.1 and No.3 cylinder exhaust valves using a feeler gauge.

### VALVE CLEARANCE:

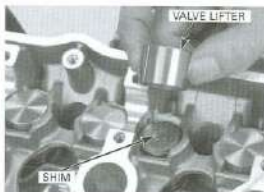
EX:  $0.25 \pm 0.03$  mm ( $0.010 \pm 0.001$  in)



## ADJUSTMENT

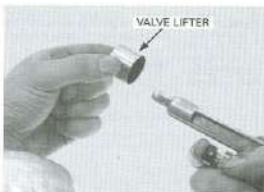
Remove the camshaft (page 8-6).

Remove the valve lifters and shims.



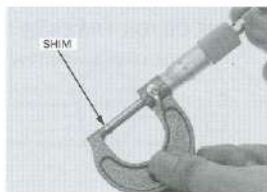
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve tapping tool or magnet.
- The shims can be easily removed with a tweezers or magnet.

Clean the valve shim contact area in the valve lifter with compressed air.



Thirty-five different shim thicknesses are available from 1.200 mm to 2.800 mm in intervals of 0.025 mm.

Measure the shim thickness and record it.

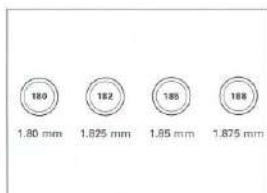


Calculate the new shim thickness using the equation below.

$$A = (B - C) + D$$

- A: New shim thickness
- B: Recorded valve clearance
- C: Specified valve clearance
- D: Old shim thickness

- Make sure of the correct shim thickness by measuring the shim by micrometer.
- Reface the valve seat if carbon deposit result in a calculated dimension of over 2.800 mm.

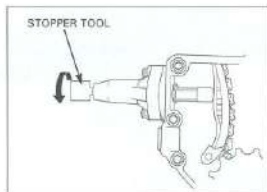


Install the newly selected shim on the valve retainer. Apply molybdenum disulfide oil to the valve lifters. Install the valve lifters into the valve lifter holes.

Install the shims and valve lifters in their original locations.

Install the camshaft (page 8-23).

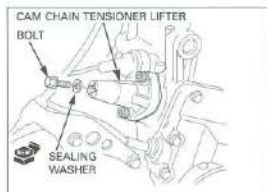
Rotate the camshafts by rotating the crankshaft clockwise several times. Recheck the valve clearance.



Remove the cam chain tensioner stopper tool.

Install the new sealing washer and cam chain tensioner lifter sealing bolt. Tighten the bolt securely.

Install the removed parts in the reverse order of removal.

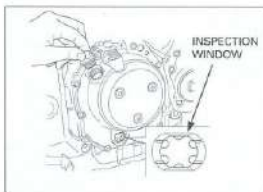


# ENGINE OIL/OIL FILTER

## OIL LEVEL INSPECTION

Start the engine and let it idle for 2 – 3 minutes.  
Turn off the engine and support the motorcycle level surface.

Check the oil level through the inspection window.



Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

If the level is below the lower line, remove the oil filler cap and fill the crankcase with recommended oil up to the upper level line.

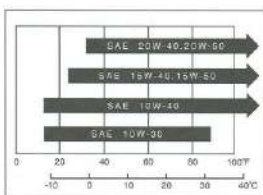
Remove the oil filler cap.

Fill the recommended engine oil up to the upper level line.

## RECOMMENDED ENGINE OIL:

Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (USA & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil API service classification SG or Higher except oils labeled as energy conserving on the API service label,  
JASO T903 standard MA  
Viscosity: SAE 10W-40

Reinstall the filler cap.



Change the engine oil with the engine warm and the motorcycle on level ground to assure complete draining.

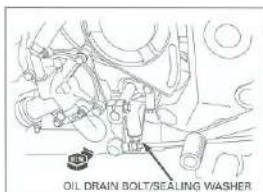
## ENGINE OIL & FILTER CHANGE

Warm up the engine.

Stop the engine and remove the oil filler cap.

Remove the drain bolt, drain the oil completely.

Check that the sealing washer on the drain bolt is in



good condition, and replace if necessary.  
Install and tighten the drain bolt.

**TORQUE: 29 N·m (3.0 kgf-m, 22 lbf-ft)**

Remove and discard the oil filter cartridge using the special tool.

## TOOL:

Oil filter wrench

07HAA-PJ70100



Apply clean engine oil to the new oil filter O-ring.

Install the new oil filter and tighten it to the specified torque.

**TOOL:**

Oil filter wrench **07HAA-PJ70109**

**TORQUE:** 26 N·m (2.7 kgf·m, 20 lbf·ft)

Fill the crankcase with recommended engine oil.

**OIL CAPACITY:**

3.5 liter (3.7 US qt, 3.1 imp qt) after draining

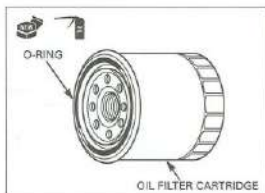
3.6 liter (3.8 US qt, 3.2 imp qt) after draining/filter change

Install the oil filler cap.

Start the engine and let it idle for 2 to 3 minutes.

Stop the engine and recheck the oil level.

Make sure there are no oil leaks.



## ENGINE IDLE SPEED

Open and support the front end of fuel tank (page 3-4).

- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment.

Warm up the engine for about ten minutes.

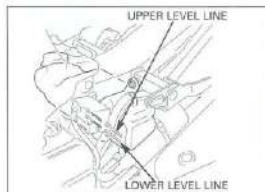
Turn the throttle stop screw as required to obtain the specified idle speed.

**IDLE SPEED:**  $1,200 \pm 100 \text{ min}^{-1} \text{ (rpm)}$



## RADIATOR COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature. The level should be between the "UPPER" and "LOWER" level lines.



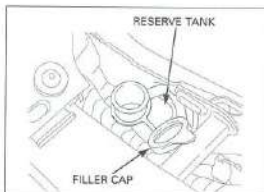
If necessary, add recommended coolant.

### RECOMMENDED ANTIFREEZE:

**Pro Honda Coolant** or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors specifically recommended for use in aluminum engines.

Remove the reserve tank filler cap and fill to the "UPPER" level line with a 50/50 mixture of distilled water and antifreeze.

Reinstall the filler cap.



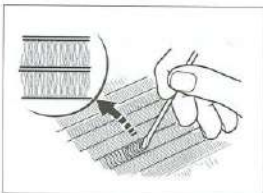
## COOLING SYSTEM

Remove the lower cowl and inner half cowl (page 2-4).

Check the radiator air passages for clogging or damage.

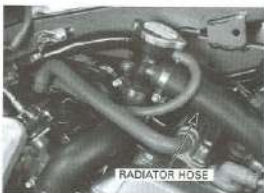
Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



Inspect the radiator hoses for cracks or deterioration, and replace if necessary.

Check the tightness of all hose clamps and fasteners.



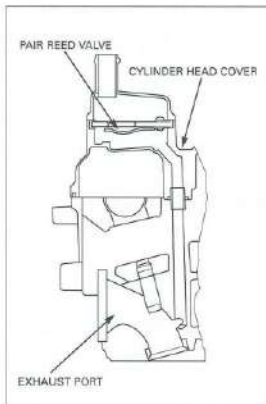


## SECONDARY AIR SUPPLY SYSTEM

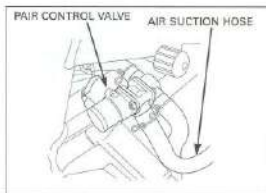
- This model is equipped with a built-in secondary air supply system. The pulse secondary air supply system is located on the cylinder head cover.
- The secondary air supply system introduces filtered air into exhaust gases in the exhaust port. The secondary air is drawn into the exhaust port whenever there is negative pressure pulse in the exhaust system. This charged secondary air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water.

*If the hoses show any signs of heat damage, inspect the PAIR check valve in the PAIR reed valve cover for damage.*

Check the PAIR (pulse secondary air injection) tubes between the PAIR control solenoid valve and cylinder head cover for deterioration, damage or loose connections. Make sure that the hoses are not cracked.

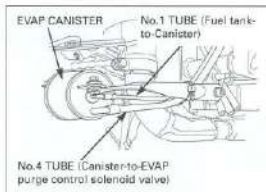


Check the air suction hose between the air cleaner housing and PAIR control solenoid valve for deterioration, damage or loose connections. Make sure that the hoses are not kinked, pinched or cracked.



## EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

Check the evaporative emission (EVAP) canister for cracks or damage.

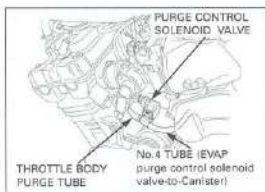


Check the tubes between the fuel tank, EVAP canister, EVAP purge control valve and throttle body for deterioration, damage or loose connections. Also check that the tubes are not kinked or pinched.

Refer to the Vacuum Hose Routing Diagram Label and Cable & Harness Routing (page 1-27) for tube connections and routing.

Check the air suction hose between the air cleaner housing and PAIR control solenoid valve for deterioration, damage or loose connections.

Make sure that the hoses are not kinked, pinched or cracked.



## DRIVE CHAIN

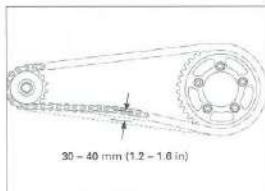
### DRIVE CHAIN SLACK INSPECTION

Turn the ignition switch OFF, place the motorcycle on its side stand and shift the transmission into neutral. Check the slack in the drive chain lower run midway between the sprockets.

**CHAIN SLACK:** 30 – 40 mm (1.2 – 1.6 in)

#### NOTICE

Excessive chain slack, 50 mm (2.0 in) or more, may damage the frame.



### ADJUSTMENT

Loosen the rear axle nut.

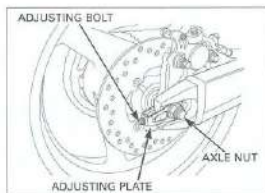
Turn both adjusting bolts until the correct drive chain slack is obtained.

Make sure the index marks on both adjusting plate are aligned with the end of the swingarm.

Tighten the rear axle nut to the specified torque.

**TORQUE:** 93 N·m (9.5 kgf·m, 69 lbf·ft)

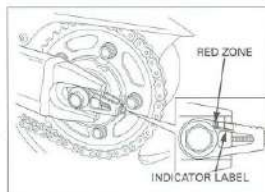
Recheck the drive chain slack and free wheel rotation.



Lubricate the drive chain with #80 – 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

Check the drive chain wear indicator label attached on the left drive chain adjusting plate.

If the swingarm index mark reaches the red zone of the indicator label, replace the drive chain with a new one (page 3-21).



## CLEANING AND LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.

Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear. Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

NON-FLAMMABLE OR HIGH FLASH  
POINT SOLVENT

CLEAN



WIPE AND DRY



SOFT  
BRUSH

Inspect and replace sprocket as necessary.

Lubricate the drive chain with #80 - 90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

LUBRICATE



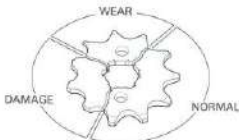
#80 - 90 GEAR OIL OR  
DRIVE CHAIN LUBRICANT

## SPROCKET INSPECTION

Inspect the drive and driven sprocket teeth for wear or damage, replace if necessary.

Never use a new drive chain on worn sprockets.

Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.



Check the attaching bolts and nuts on the drive and driven sprockets.

If any are loose, torque them.

### TORQUE:

Drive sprocket bolt: 54 N-m (5.5 kgf-m, 40 lbf-ft)

Driven sprocket nut: 108 N-m (11.0 kgf-m,  
80 lbf-ft)



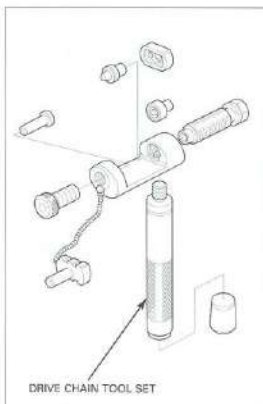
## REPLACEMENT

This motorcycle uses a drive chain with a staked master link.  
Loosen the drive chain (page 3-16).  
Assemble the special tool as shown.

### TOOL:

Drive chain tool set

07HMH-MR10103



*When using the special tool, follow the manufacturer's instruction.*

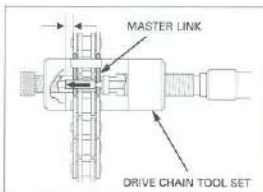
Locate the crimped pin ends of the master link from the outside of the chain, and remove the link with the drive chain tool set.

### TOOL:

Drive chain tool set

07HMH-MR10103

Remove the drive chain.



*Include the master link when you count the drive chain links.*

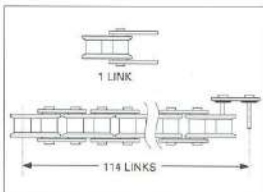
Remove the excess drive chain links from the new drive chain with the drive chain tool set.

**STANDARD LINKS:** 114 links

**REPLACEMENT CHAIN:**

DID: DID50VA8-114LE

RK: RK50HFOZ5-114LE



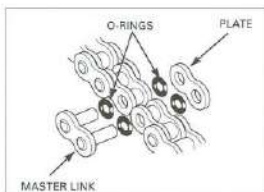
Never reuse the old drive chain, master link, master link plate and O-rings.  
Assemble the new master link, O-rings and plate.

Assemble and set the drive chain tool set.

**TOOL:**

Drive chain tool set

07HMH-MR10103



*Insert the master link from the inside of the drive chain, and install the plate with the identification mark facing the outside.*

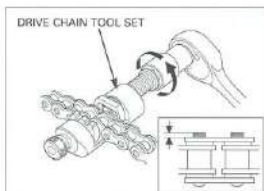
Make sure that the master link pins are installed properly.  
Measure the master link pin length projected from the plate.

**STANDARD LENGTH:**

**DID:** 1.15 – 1.55 mm (0.045 – 0.061 in)

**RK:** 1.2 – 1.4 mm (0.05 – 0.06 in)

Stake the master link pins.



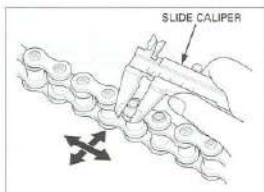
*A drive chain with a clip-type master link must not be used.*

Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

**DIAMETER OF THE STAKED AREA:**

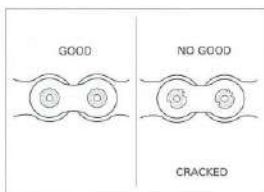
**DID:** 5.50 – 5.80 mm (0.217 – 0.228 in)

**RK:** 5.55 – 5.85 mm (0.219 – 0.230 in)



After staking, check the staked area of the master link for cracks.

If there is any cracking, replace the master link, O-rings and plate.



### DRIVE CHAIN GUIDE PLATE INSPECTION

Remove the drive sprocket cover and guide plate.

Check the drive chain guide plate for wear or damage and replace if necessary.



## BRAKE FLUID

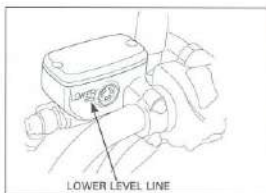
### NOTE:

- Do not mix different types of fluid, as they are not compatible with each other.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

When the fluid level is low, check the brake pads for wear (see next page). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check entire system for leaks (see next page).

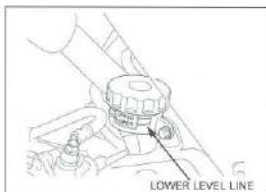
### FRONT BRAKE

Turn the handlebar so that the reservoir is level and check the front brake fluid reservoir level. If the level is near the lower level line, check the brake pad wear (see below).



### REAR BRAKE

Place the motorcycle on a level surface, and support it in an upright position. Check the rear brake fluid reservoir level. If the level is near the lower level line, check the brake pad wear (see below).

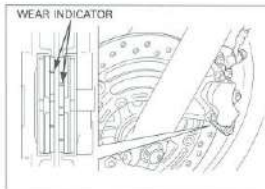


## BRAKE PAD WEAR

### FRONT BRAKE PADS

Check the brake pad for wear.  
Replace the brake pads if either pad is worn to the bottom of the wear limit groove.

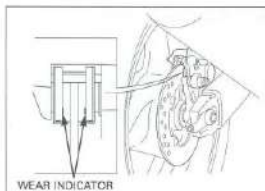
Refer to page 15-7 for brake pad replacement.



### REAR BRAKE PADS

Check the brake pad for wear.  
Replace the brake pads if either pad is worn to the bottom of the wear limit groove.

Refer to page 15-8 for brake pad replacement.



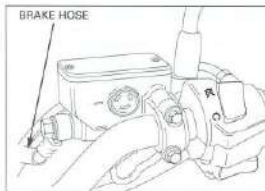
## BRAKE SYSTEM

### INSPECTION

Firmly apply the brake lever or pedal, and check that no air has entered the system.  
If the lever or pedal feels soft or spongy when operated, bleed the air from the system.

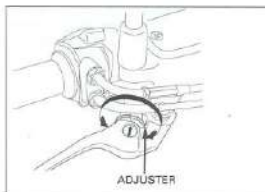
Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.  
Tighten any loose fittings.  
Replace hoses and fittings as required.

Refer to page 15-5 for brake bleeding procedures.



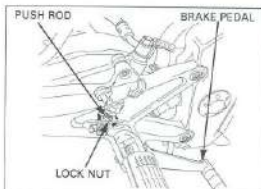
### BRAKE LEVER ADJUSTMENT

The distance between the top of the brake lever and the grip can be adjusted by turning the adjuster.



### BRAKE PEDAL HEIGHT ADJUSTMENT

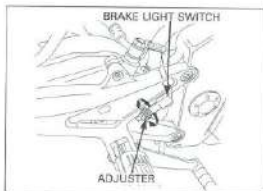
Loosen the lock nut and turn the push rod until the correct pedal height is obtained.



### BRAKE LIGHT SWITCH

*The front brake light switch does not require adjustment.*

Adjust the brake light switch so that the brake light comes on just prior to the brake actually being engaged. If the light fails to come on, adjust the switch so that the light comes on at the proper time. Hold the switch body and turn the adjuster. Do not turn the switch body.

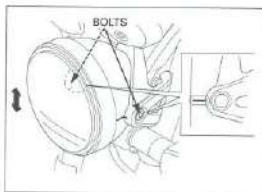


### HEADLIGHT AIM

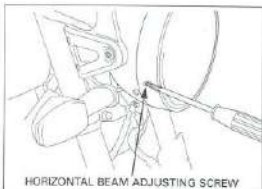
*Adjust the headlight beam as specified by local laws and regulations.*

Place the motorcycle on a level surface.

Adjust the headlight beam vertically by loosening the headlight mount bolts.



Adjust the headlight beam horizontally by turning the horizontal beam adjusting screw. A clockwise rotation moves the beam toward the right side of the rider.



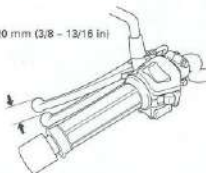


# CLUTCH SYSTEM

Measure the clutch lever free play at the end of the clutch lever.

**FREE PLAY:** 10 – 20 mm (3/8 – 13/16 in)

10 – 20 mm (3/8 – 13/16 in)



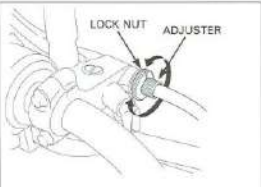
Minor adjustments are made using the upper adjuster at the clutch lever.  
Loosen the lock nut and turn the adjuster.

## NOTICE

*The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.*

If the adjuster is threaded out near its limit and the correct free play cannot be obtained, turn the adjuster all the way in and back out one turn.  
Tighten the lock nut and make a major adjustment as described below.

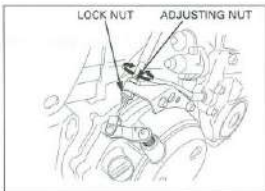
LOCK NUT ADJUSTER



Major adjustments are performed at the clutch arm.  
Loosen the lock nut and turn the adjusting nut to adjust free play.  
Hold the adjusting nut securely while tightening the lock nut.

If proper free play cannot be obtained, or the clutch slips during a test ride, disassemble and inspect the clutch (see section 9).

LOCK NUT ADJUSTING NUT



## SIDE STAND

Support the motorcycle on a level surface.

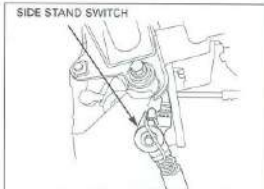
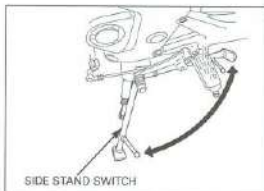
Check the side stand spring for damage or loss of tension.

Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.

Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the side stand full down.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (section 19).



## SUSPENSION

*Loose, worn or damaged suspension parts impair motorcycle stability and control.*

### FRONT SUSPENSION INSPECTION

Check the action of the forks by compressing the front suspension several times.

Check the entire fork assembly for signs of leaks, damage or loose fasteners.

Replace damaged components that cannot be repaired.

Tighten all nuts and bolts (page 1-13).

Refer to section 13 for fork service.



### REAR SUSPENSION INSPECTION

Check the action of the shock absorber by compressing it several times.

Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components that cannot be repaired.

Tighten all nuts and bolts (page 1-13).

Place the motorcycle on a work stand or box to raise the rear wheel off the ground and support the motorcycle securely. Check for worn swingarm bearings by grabbing the swingarm and attempting to move the wheel side to side. Replace the bearings if any looseness is noted.



Refer to section 14 for shock absorber and swingarm service.



## REAR SUSPENSION ADJUSTMENT

### SPRING PRE-LOAD ADJUSTER

Spring preload can be adjusted by turning the adjuster using a pin spanner.

## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).

Check that all safety clips, hose clamps and cable stays are in place and properly secured.

## WHEELS/TIRES

### NOTICE

Tire pressure should be checked when the tires are COLD.

### RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		FRONT	REAR
Tire pressure kPa (kgf/cm <sup>2</sup> , psi)		250 (2.50, 36)	290 (2.90, 42)
Tire size		120/70 ZR 17 (58W)	180/55 ZR 17 (73W)
		120/70 ZR 17 M/C (58W)	180/55 ZR 17 M/C (73W)
Tire brand	Bridgestone	BT56F RADIAL	NBT56R RADIAL G
	Michelin	TX15	TX25



Check the tires for cuts, embedded nails, or other damage.

Check the front and rear wheels for trueness (refer to section 13 and 14).

Measure the tread depth at the center of the tires. Replace the tires when the tread depth reaches the following limits.

**MINIMUM TREAD DEPTH:**

**FRONT:** 1.5 mm (0.06 in)

**REAR:** 2.0 mm (0.08 in)

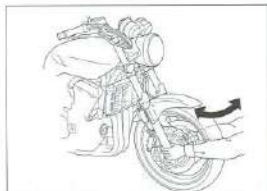
## STEERING HEAD BEARINGS

Check that the control cables do not interfere with handlebar rotation.

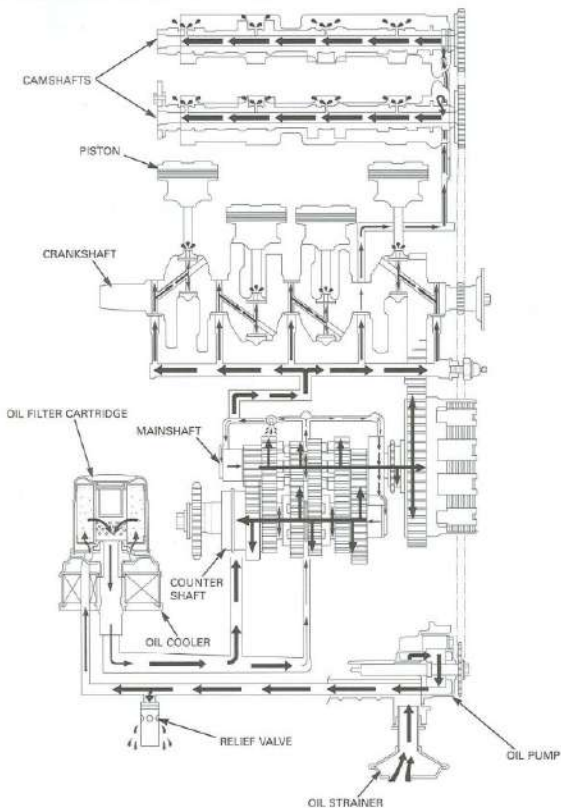
Support the motorcycle securely and raise the front wheel off the ground.

Check that the handlebar moves freely from side to side.

If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (Section 13).



# LUBRICATION SYSTEM DIAGRAM



# 4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-0	OIL STRAINER/PRESSURE RELIEF VALVE	4-3
SERVICE INFORMATION	4-1	OIL PUMP	4-5
TROUBLESHOOTING	4-2	OIL COOLER	4-8
OIL PRESSURE INSPECTION	4-3		

## SERVICE INFORMATION

### GENERAL

#### CAUTION

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

- The oil pump can be serviced with the engine installed in the frame.
- The service procedures in this section must be performed with the engine oil drained.
- When removing and installing the oil pump, use care not to allow dust or dirt to enter the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.
- After the oil pump has been installed, check that there are no oil leaks and that oil pressure is correct.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.5 liter (3.7 US qt, 3.1 imp qt)	—
	After draining/filter change	3.6 liter (3.8 US qt, 3.2 imp qt)	—
	After disassembly	4.4 liter (4.6 US qt, 3.9 imp qt)	—
Recommended engine oil		Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil (USA & Canada), or Honda 4-stroke oil (Canada only), or an equivalent motor oil API service classification SG or Higher except oils labeled as energy conserving on the API service label. JASO T903 standard MA Viscosity: SAE 10W-40	—
Oil pressure at oil pressure switch		490 kPa (5.0 kgf/cm <sup>2</sup> , 71 psi) at 6,000 min <sup>-1</sup> (rpm)/(80°C/176°F)	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 - 0.22 (0.006 - 0.009)	0.35 (0.014)
	Side clearance	0.02 - 0.07 (0.001 - 0.003)	0.10 (0.004)

### TORQUE VALUES

Oil main gallery sealing bolt (20 mm)	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply a locking agent to the threads
Oil pump cover bolt	8 N·m (0.8 kgf·m, 5.8 lbf·ft)	CT bolt
Oil cooler bolt (filter boss)	54 N·m (5.5 kgf·m, 47 lbf·ft)	Apply oil to the threads and flange surface
Engine oil filter cartridge	26 N·m (2.7 kgf·m, 20 lbf·ft)	Apply oil to the threads and flange surface and O-ring
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	

### TOOLS

Oil pressure gauge set  
Oil pressure gauge attachment  
Oil filter wrench

07506-300000  
07510-MJ10100  
07HAA-PJ70100

Equivalent commercially available in U.S.A.  
Equivalent commercially available in U.S.A.

### TROUBLESHOOTING

#### Oil level too low

- Oil consumption
- External oil leak
- Worn piston rings
- Improperly installed piston rings
- Worn cylinders
- Worn stem seals
- Worn valve guide

#### Low oil pressure

- Oil level low
- Clogged oil strainer
- Faulty oil pump
- Internal oil leak
- Incorrect oil being used

#### No oil pressure

- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive or driven sprocket
- Damaged oil pump
- Internal oil leak

#### High oil pressure

- Oil pressure relief valve stuck closed
- Clogged oil filter, gallery or metering orifice
- Incorrect oil being used

#### Oil contamination

- Oil or filter not changed often enough
- Worn piston rings

#### Oil emulsification

- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

## OIL PRESSURE INSPECTION

If the oil pressure indicator light remains on a few seconds, check the indicator system before checking the oil pressure.

Check the oil level (page 3-15).

Warm up the engine to normal operating temperature (approximately 80°C/176°F).  
Stop the engine and remove the oil main gallery sealing bolt.



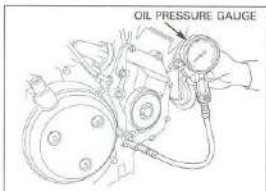
Connect an oil pressure gauge and attachment to the main gallery.

### TOOLS:

**Oil pressure gauge set** 07506-3000000  
(Equivalent commercially available in U.S.A)

**Oil pressure gauge attachment** 07510-MJ10100  
(Equivalent commercially available in U.S.A)

Start the engine and increase the rpm to 5,000 min<sup>-1</sup> (rpm) and read the oil pressure.



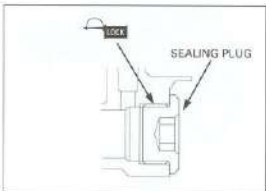
### OIL PRESSURE:

490 kPa (5.0 kgf/cm<sup>2</sup>, 71 psi) at 5,000 min<sup>-1</sup> (rpm)/ (80°C/176°F)

Stop the engine and remove the tools.

Apply a locking agent to the sealing plug threads. Install and tighten the sealing plug to the specified torque.

**TORQUE:** 29 N·m (3.0 kgf·m, 22 lbf·ft)

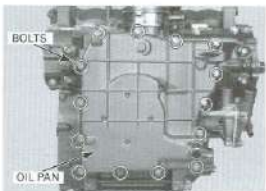


## OIL STRAINER/PRESSURE RELIEF VALVE

### REMOVAL

Drain the engine oil (page 3-17).  
Remove the exhaust pipe (page 2-6).

Remove the oil pan flange bolts and oil pan.





## LUBRICATION SYSTEM

Remove the pressure relief valve.



Remove the oil strainer and packing.

Clean the oil strainer screen.



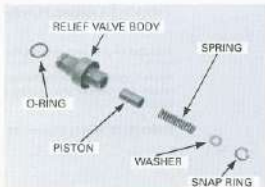
### INSPECTION

Check the operation of the pressure relief valve by pushing on the piston.

Disassemble the relief valve by removing the snap ring.

Inspect the piston for wear, sticking or damage.  
Inspect the spring for weakness or damage.

Assemble the relief valve in the reverse order of disassembly.



### INSTALLATION

Apply oil to the new packing and install it onto the oil strainer.

Install the oil strainer into the crankcase while aligning its boss with the groove of the crankcase.

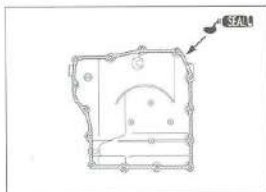


Apply oil to the new O-ring and install it onto the relief valve.  
Install the relief valve into the crankcase.



*Do not apply  
more sealant than  
necessary.*

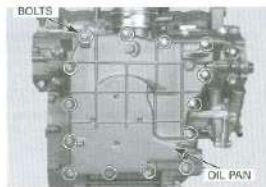
Clean the oil pan mating surface thoroughly.  
Apply Three Bond 1207B or an equivalent to the mating surface.



Install the oil pan onto the lower crankcase.  
Install the oil pan mounting bolts.  
Tighten the all bolts in a crisscross pattern in 2 - 3 steps.

Install the exhaust pipe (page 2-7).  
Fill the crankcase with recommended oil (page 3-17).

After installation, check that there are no oil leaks.



## OIL PUMP

### REMOVAL

Remove the clutch and oil pump driven sprocket (page 9-9).

Remove the three flange bolts and oil pump assembly.

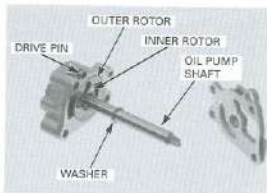
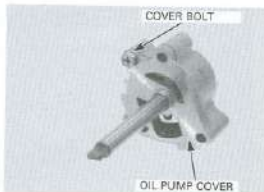


### DISASSEMBLY

Remove the dowel pins.

Remove the oil pump cover bolt and oil pump cover.

Remove the thrust washer, drive pin, oil pump shaft, outer rotor and inner rotor from the oil pump body.



### INSPECTION

*If any portion of the oil pump is worn beyond the service limit, replace the oil pump as an assembly.*

Temporarily install the oil pump shaft. Install the outer and inner rotors into the oil pump body.

Measure the rotor tip clearance.

**SERVICE LIMIT: 0.20 mm (0.008 in)**



Measure the pump body clearance.

**SERVICE LIMIT: 0.35 mm (0.014 in)**

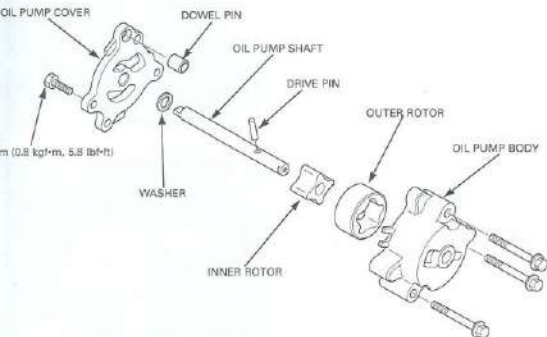


Measure the side clearance using a straight edge and feeler gauge.

**SERVICE LIMIT: 0.10 mm (0.004 in)**



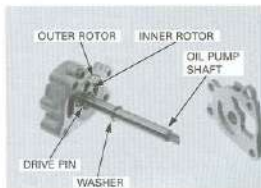
## ASSEMBLY



*Install the outer rotor with its punch mark facing the oil pump cover.*

Install the outer rotor into the oil pump body with its punch mark facing the oil pump cover.  
Install the inner rotor into the outer rotor with its drive pin groove facing the oil pump cover.  
Install the oil pump shaft through the inner rotor and oil pump body.

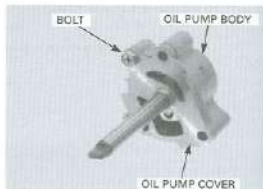
Install the drive pin into the hole in the pump shaft and align the pin with the groove in the inner rotor as shown.  
Install the thrust washer.  
Install the dowel pin.



Install the oil pump cover and tighten the bolt to the specified torque.

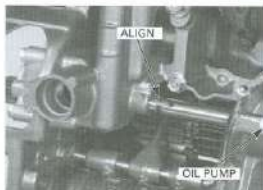
**TORQUE: 8 N·m (0.8 kgf·m, 5.8 lbf·ft)**

Check the oil pump operation by turning the pump shaft.  
If necessary, reassemble the oil pump.



### INSTALLATION

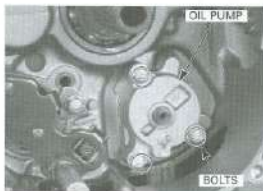
Install the oil pump onto the crankcase while aligning the pump shaft lug with the water pump shaft groove by turning the oil pump shaft.



Install and tighten the three flange bolt securely.

Install the clutch assembly (page 9-10).

After installation, fill the crankcase with recommended oil and check that there are no oil leaks (page 3-12).  
Check the oil pressure (page 4-3).



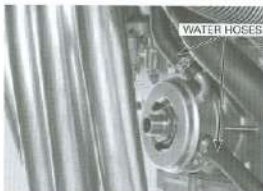
## OIL COOLER

### REMOVAL

Drain the engine oil and remove the oil filter cartridge (page 3-12).

Drain the coolant from the system (page 5-4).

Loosen the hose bands and disconnect the oil cooler water hoses from the cooler.



Remove the oil cooler bolt (filter boss), washer and oil cooler.

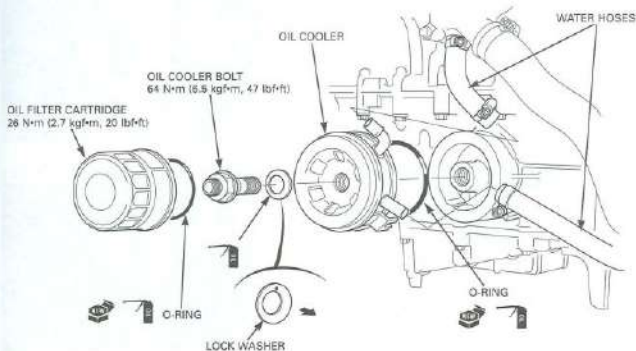
Remove the O-ring from the oil cooler.

## INSPECTION

Check the oil cooler for damage.



## INSTALLATION



Coat a new O-ring with engine oil and install it into the oil cooler groove.

Install the oil cooler aligning its guide groove with the lug on the crankcase.

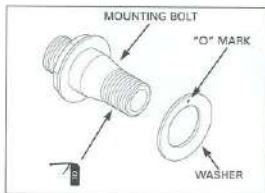


## LUBRICATION SYSTEM

Apply oil to the oil cooler bolt threads and seating surface.

Install the lock washer and oil cooler bolt.

*Install the lock washer with its concave side ("o" mark) facing the oil cooler.*



*Be sure the oil cooler bolt collar slides inside the oil cooler.*

Tighten the oil cooler bolt to the specified torque.

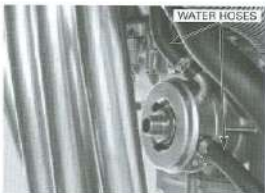
**TORQUE: 64 N·m (6.5 kgf-m, 47 lbf-ft)**

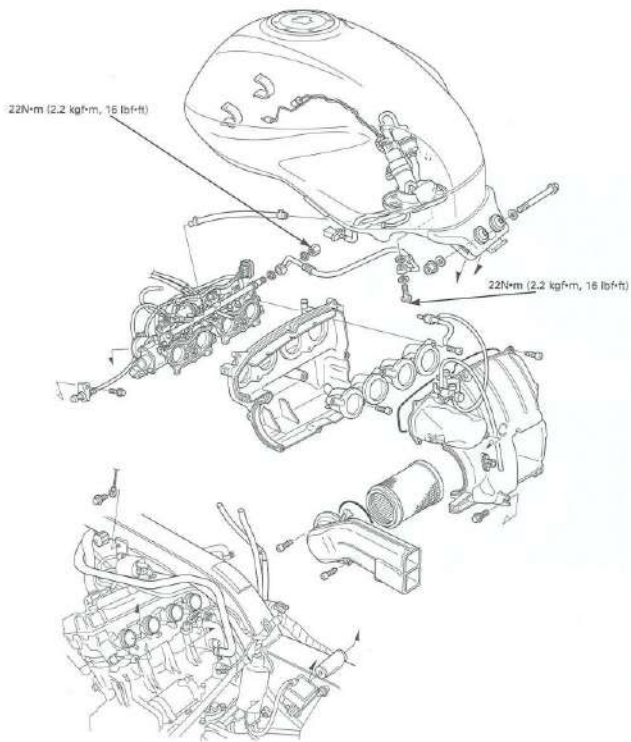


Connect the oil cooler water hoses, tighten the hose bands securely.

Install the oil filter cartridge and fill the crankcase with recommended oil (page 3-12).

Fill the cooling system and bleed air (page 6-5).







# 5. FUEL SYSTEM (Programmed Fuel Injection)

SERVICE INFORMATION	5-1	PRESSURE REGULATOR	5-63
TROUBLESHOOTING	5-3	STARTER VALVE CABLE/ THROTTLE STOP CONTROL KNOB	5-64
SYSTEM LOCATION	5-4	STARTER VALVE	5-65
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PGM-FI (PROGRAMMED FUEL INJECTION) SYSTEM	5-6	MAP SENSOR	5-70
PGM-FI SELF-DIAGNOSIS MALFUNCTION INDICATOR LAMP (MIL)		IAT SENSOR	5-71
FAILURE CODES	5-10	ECT SENSOR	5-71
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FUEL CUT RELAY	5-48	BANK ANGLE SENSOR	5-74
FUEL TANK	5-49	ENGINE STOP RELAY	5-75
AIR CLEANER HOUSING	5-53	ECM (ENGINE CONTROL MODULE)	5-76
THROTTLE BODY	5-58	PAIR SOLENOID VALVE	5-77
INJECTOR	5-62		

## SERVICE INFORMATION

### GENERAL

- Be sure to relieve the fuel pressure while the engine is OFF.
- Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

## FUEL SYSTEM (Programmed Fuel Injection)

- Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.
- Do not apply excessive force to the fuel pipe on the throttle body while removing or installing the throttle body.
- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- Prevent dirt and debris from entering the throttle bore, fuel tube and return tube, clean them using compressed air.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.
- Do not push the fuel pump base under the fuel tank when the fuel tank is stored.
- Always replace the packing when the fuel pump is removed.
- The programmed fuel injection system is equipped with the Self-Diagnostic System described on page 5-6. If the malfunction indicator lamp (MIL) blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI, always follow the steps in the troubleshooting flow chart (page 5-10).
- The PGM-FI system is provided with fail-safe function to secure a minimum running capability even when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is secured by making use of the numerical values of a situation preset in advance in the simulated program map. It must be remembered, however, that when any abnormality is detected in four injectors and/or the ignition and cam pulse generator, the fail safe function stops the engine from the standpoint of protecting it.
- For PGM-FI system location, see page 5-4.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- For fuel reserve sensor inspection, see section 19.
- The vehicle speed sensor sends digital pulse signals to the ECM (PGM-FI unit) for computation. For vehicle speed sensor inspection, see section 19.
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel tube, release the fuel pressure by loosening the fuel tube banjo bolt at the fuel tank.
- Always replace the sealing washers when the fuel tube banjo bolt is removed or loosened.
- Use a digital tester for PGM-FI system inspection.

## SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle body identification number	Except California type	GQ34C
	California type	GQ34B
Starter valve vacuum difference		2654 Pa (20 mm Hg)
Base throttle valve for asynchronization		No.2
Idle speed		1,200 ± 100 min <sup>-1</sup> (rpm)
Throttle grip free play		2 - 4 mm (1/16 - 3/16 in)
Intake air temperature sensor resistance (at 20°C/68°F)		1 - 4 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)		2.3 - 2.6 kΩ
Fuel injector resistance (at 20°C/68°F)		11.1 - 12.3 Ω
PAIR solenoid valve resistance (at 20°C/68°F)		20 - 24 Ω
Cam pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)		0.7 V minimum
Manifold absolute pressure at idle		200 - 250 mm Hg
Fuel pressure at idle		343 kPa (3.5 kg/cm <sup>2</sup> , 50 psi)
Fuel pump flow (at 12 V)		256 cm <sup>3</sup> (8.7 US oz, 9.0 imp oz) minimum/10 seconds

## TORQUE VALUES

ECT/thermo sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Throttle body insulator band screw	See page 1-14	
Starter valve cable stay screw	1 N·m (0.09 kgf·m, 0.7 lbf·ft)	
Starter valve lock nut	2 N·m (0.18 kgf·m, 1.3 lbf·ft)	
Pressure regulator mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Fuel tube banjo bolt (fuel tank side)	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fuel tube sealing nut (throttle body side)	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fuel pump mounting nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	See page 5-54 for tightening sequence

## TOOLS

Fuel pressure gauge	07406-0040003	or 07406-0040002
Peak voltage tester (U.S.A. only) or Peak voltage adaptor	07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)	
ECU test harness	07YMZ-0010100	(two required)

## TROUBLESHOOTING

### Engine won't start

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel tube
- Faulty fuel pump
- Clogged fuel filter
- Clogged fuel injector filter
- Sticking fuel injector needle
- Faulty fuel pump operating system

### Engine stalls, hard to start, rough idling

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel tube
- Idle speed misadjusted
- Starter valve synchronization misadjusted

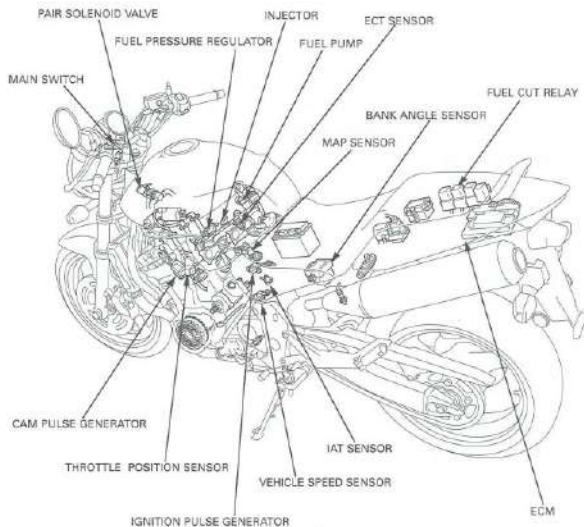
### Backfiring or misfiring during acceleration

- Ignition system malfunction

### Poor performance (drivability) and poor fuel economy

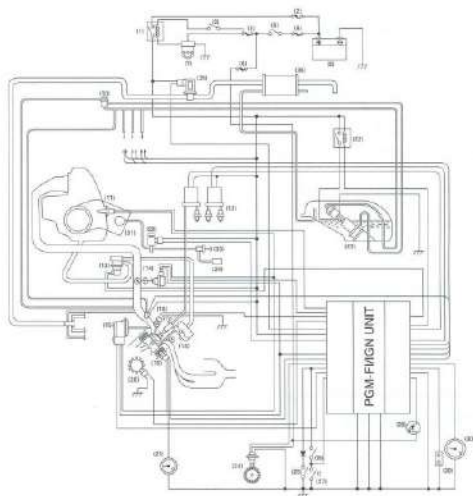
- Pinched or clogged fuel tube
- Faulty pressure regulator

### SYSTEM LOCATION



FULL NAME	ABBREVIATIONS
Manifold absolute pressure sensor	MAP sensor
Throttle position sensor	TP sensor
Intake air temperature sensor	IAT sensor
Engine coolant temperature sensor	ECT sensor
Engine control module	ECM

# SYSTEM DIAGRAM



- (1) Engine stop relay
- (2) PGM-FI fuse (20A)
- (3) Engine stop switch
- (4) Sub-fuse (10A)
- (5) Ignition switch
- (6) Main fuse A (30A)
- (7) Bank angle sensor
- (8) Sub-fuse (10A)
- (9) Battery
- (10) Fuel Pressure regulator
- (11) IAT sensor
- (12) Ignition coil/spark plug
- (13) PAIR solenoid valve
- (14) TP sensor
- (15) MAP sensor
- (16) Injector
- (17) Cam pulse generator
- (18) PAIR check valve
- (19) ECT sensor

- (20) Ignition pulse generator
- (21) Water temperature
- (22) Fuel cut relay
- (23) Fuel pump
- (24) Vehicle speed sensor
- (25) Neutral switch
- (26) Clutch switch
- (27) Side stand switch
- (28) Malfunction indicator lamp (MIL)
- (29) Service check connector
- (30) Tachometer
- (31) Intake air duct control diaphragm
- (32) By-pass solenoid valve
- (33) One-way valve
- (34) Chamber
- (35) EVAP purge control solenoid valve (California type only)
- (36) EVAP canister (California type only)

## PGM-FI (PROGRAMMED FUEL INJECTION) SYSTEM

### SELF-DIAGNOSTIC PROCEDURES

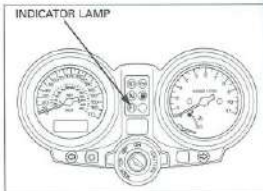
Place the motorcycle on its side stand.  
Start the engine and let it idle.

*The malfunction indicator lamp (MIL) will start blinking only with the side stand down and with the engine off (engine stop switch is set to R/L/H) or engine revs are below 5,000 rpm (rpm). In any other conditions, the MIL will illuminate and stay on.*

If the malfunction indicator blinks, note how many times the MIL blinks, and determine the cause of the problem (page 5-10 through 5-49).

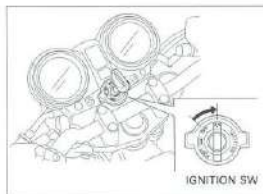
If the system is not malfunctioning, the MIL (indicator lamp) will not light or blink.

If you wish to read the PGM-FI memory for trouble data, perform the following to read the stored problem data.



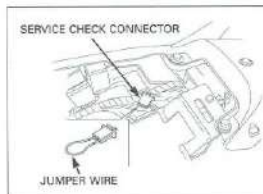
#### To read the stored problem data

Turn the ignition switch OFF.



Remove the seat (page 2-2).

Short the PGM-FI system service check connector terminals using a jumper wire.



Turn the ignition switch ON and engine stop switch to RUN.

*Even if the PGM-FI has memory data, the MIL does not blink while the engine is running.*

If the ECM has no self diagnosis memory data, the MIL will illuminate when you turn the ignition switch ON.

If the ECM has self diagnosis memory data, the MIL will start blinking when you turn the ignition switch ON.

Note how many times the MIL blinks, and determine the cause of the problem (page 5-10 through 5-49).

IGNITION SWITCH



INDICATOR LAMP



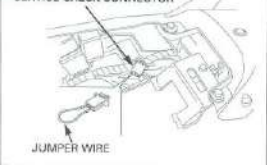
## SELF-DIAGNOSIS RESET PROCEDURE

1. Turn the engine stop switch to RUN and ignition switch OFF.
2. Short the service check connector of the PGM-FI system using a jumper wire.
3. Turn the ignition switch ON.
4. Remove the jumper wire from the service check connector.
5. The MIL lights for about 5 seconds. While the indicator lights, short the service check connector again with the jumper wire. Self diagnosis memory data is erased, if the MIL turns off and starts blinking.

- The service check connector must be jumped while the indicator lights. If not, the MIL will not start blinking.
- Note that the self diagnosis memory data cannot be erased if you turn off the ignition switch before the MIL starts blinking.

If the MIL blinks 20 times, the data has not been erased, so try again.

SERVICE CHECK CONNECTOR



INDICATOR LAMP



### PEAK VOLTAGE INSPECTION PROCEDURE

- Use this procedure for the ignition pulse generator and cam pulse generator inspection.
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that all the spark plugs are installed correctly.
- Use the recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M  $\Omega$ /DCV minimum.
- If the imris diagnostic tester (model 825) is used, follow the manufacturer's instruction.
- The display value differs depending upon the internal impedance of the multimeter.
- Disconnect the fuel pump connector before checking the peak voltage.

Open and support the front end of fuel tank (page 3-4).

Disconnect the fuel pump/reserve sensor 3P connector.

*Avoid touching the tester probes to prevent electric shock.*

Connect the peak voltage adaptor to the digital multimeter.

#### TOOLS:

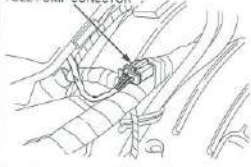
Peak voltage tester (U.S.A. only) or  
Peak voltage adaptor 07HGJ-0020100  
(not available in U.S.A.) with commercially  
available digital multimeter (impedance 10 M  $\Omega$ /DCV  
minimum)

### TEST HARNESS CONNECTION

Remove the rear cowl (page 2-2).  
Remove the two bolts from the rear fender.

Disconnect the ECM 22P (Black) and 22P (Light gray) connectors from the unit.

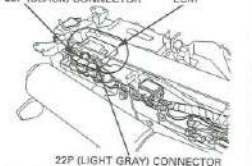
FUEL PUMP CONNECTOR



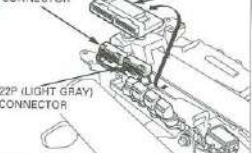
DIGITAL MULTIMETER



22P (BLACK) CONNECTOR ECM



22P (BLACK) CONNECTOR ECM

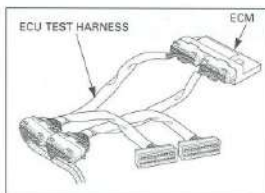




Connect the ECU test harnesses between the main wire harness and the ECM.

TOOL: ECU test harness

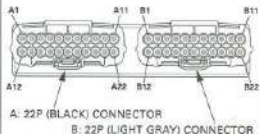
07YIMZ-0010100  
(two required)



## TEST HARNESS TERMINAL LAYOUT

The ECM connector terminals are numbered as shown in the illustration.

VIEW FROM WIRE HARNESS SIDE:











The test harness terminals are same layout as for the ECM connector terminals as shown.









FOR 22P (BLACK) CONNECTOR  
FOR 22P (LIGHT GRAY) CONNECTOR



# **PGM-FI SELF-DIAGNOSIS MALFUNCTION INDICATOR LAMP (MIL) FAILURE CODES**

- The PGM-FI MIL denotes the failure codes (the number of blinks from 0 to 33). When the indicator lights for 1.3 seconds it is equivalent to ten blinks. For example, a 1.3 second illumination and two blinks (0.5 second X 2) of the indicator equals 12 blinks. Follow code 12 on page 5-26).
- When more than one failure occurs, the MIL shows the blinks in the order of lowest number to highest number. For example, if the indicator blinks once, then two times, two failures have occurred. Follow codes 1 and 2 on page 5-12).

Number of PGM-FI MIL blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
0	 Stay lit	<ul style="list-style-type: none"> <li>• Open circuit at the power input wire of the ECM</li> <li>• Faulty bank angle sensor</li> <li>• Open circuit in bank angle sensor related circuit</li> <li>• Faulty engine stop relay</li> <li>• Open circuit in engine stop relay related wires</li> <li>• Faulty engine stop switch</li> <li>• Open circuit in engine stop switch related wires</li> <li>• Faulty ignition switch</li> <li>• Faulty ECM</li> <li>• Blown PGM-FI fuse (20 A)</li> <li>• Open circuit in engine stop switch ground</li> <li>• Blown sub-fuse (10 A) (Starter/ignition)</li> </ul>	• Engine does not start	—
	 No blinks	<ul style="list-style-type: none"> <li>• Open or short circuit in MIL wire</li> <li>• Faulty ECM</li> </ul>	• Engine operates normally	—
	 Stay lit	<ul style="list-style-type: none"> <li>• Short circuit in service check connector</li> <li>• Faulty ECM</li> <li>• Short circuit in service check connector wire</li> </ul>	• Engine operates normally	—
1	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contacts on MAP sensor connector</li> <li>• Open or short circuit in MAP sensor wire</li> <li>• Faulty MAP sensor</li> </ul>	• Engine operates normally	5-12
2	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor connection of the MAP sensor vacuum tube</li> <li>• Faulty MAP sensor</li> </ul>	• Engine operates normally	5-14
7	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on ECT sensor</li> <li>• Open or short circuit in ECT sensor wire</li> <li>• Faulty ECT sensor</li> </ul>	• Hard start at a low temperature (Simulate using numerical values; 90°C/194°F)	5-16
8	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on TP sensor connector</li> <li>• Open or short circuit in TP sensor wire</li> <li>• Faulty TP sensor</li> </ul>	• Poor engine response when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°)	5-18
9	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on IAT sensor</li> <li>• Open or short circuit in IAT sensor wire</li> <li>• Faulty IAT sensor</li> </ul>	• Engine operates normally (Simulate using numerical values; 25°C/77°F)	5-22

Number of PGM-FI malfunction indicator blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
11	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on vehicle speed sensor connector</li> <li>• Open or short circuit in vehicle speed sensor connector</li> <li>• Faulty vehicle speed sensor</li> </ul>	<ul style="list-style-type: none"> <li>• Engine operates normally</li> </ul>	5-24
12	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on No.1 injector connector</li> <li>• Open or short circuit in No.1 injector wire</li> <li>• Faulty No.1 injector</li> </ul>	<ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>	5-26
13	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on No.2 injector connector</li> <li>• Open or short circuit in No.2 injector wire</li> <li>• Faulty No.2 injector</li> </ul>	<ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>	5-29
14	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on No.3 injector connector</li> <li>• Open or short circuit in No.3 injector wire</li> <li>• Faulty No.3 injector</li> </ul>	<ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>	5-32
15	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on No.4 injector connector</li> <li>• Open or short circuit in No.4 injector wire</li> <li>• Faulty No.4 injector</li> </ul>	<ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>	5-35
18	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on cam pulse generator</li> <li>• Open or short circuit in cam pulse generator</li> <li>• Faulty cam pulse generator</li> </ul>	<ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>	5-38
19	 Blinks	<ul style="list-style-type: none"> <li>• Loose or poor contact on ignition pulse generator connector</li> <li>• Open or short circuit in ignition pulse generator</li> <li>• Faulty ignition pulse generator</li> </ul>	<ul style="list-style-type: none"> <li>• Engine does not start</li> </ul>	5-40
20	 Blinks	<ul style="list-style-type: none"> <li>• Faulty E<sup>2</sup>-PROM in ECM</li> </ul>	<ul style="list-style-type: none"> <li>• Engine operates normally</li> <li>• Does not hold the self-diagnosis data</li> </ul>	5-48

### PGM-FI MIL 1 BLINK (MAP SENSOR)

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P connector.  
Check for loose or poor contact on the MAP sensor connector.



MAP SENSOR CONNECTOR

Connect the MAP sensor connector.  
Place the motorcycle on its side stand.  
Start the engine and check that the MIL blinks.

No blinks

- Loose or poor contact on the MAP sensor connector

1 blink

Turn the ignition switch OFF.

Disconnect the MAP sensor 3P connector.  
Turn the ignition switch ON.  
Measure the voltage at the wire harness side connector.

Out of range

- Open or short circuit in Yellow/Red wire
- Loose or poor contact on the ECM connectors



MAP SENSOR CONNECTOR

Connection: Yellow/Red (+) - Ground (-)  
Standard: 4.75 - 5.25 V

Voltage exists

Measure the voltage between the connector terminals of the wire harness side.

Out of range

- Open or short circuit in Green/Orange wire
- Loose or poor contact on the ECM connectors



MAP SENSOR CONNECTOR

Connection: Yellow/Red (+) - Green/Orange (-)  
Standard: 4.75 - 5.25 V

Voltage exists

Measure the voltage between the terminals of the wire harness side.



**Connection:**  
Light green/Yellow (+) – Green/Orange (–)  
**Standard:** 4.75 – 5.25 V

Out of range

- Open or short circuit in Light green/Yellow wire
- Loose or poor contact on the ECM connectors

Voltage exists

Turn the ignition switch OFF.  
Connect the MAP sensor 3P connector.

MAP SENSOR  
CONNECTOR



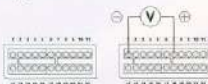
Disconnect the ECM connectors.  
Connect the test harness to ECM connectors.  
Turn the ignition switch ON.  
ECU TEST HARNESS



Measure the voltage at the test harness terminals (page 5-9).

Out of range

- Faulty MAP sensor



**Connection:** B7 (+) – B1 (–)  
**Standard:** 2.7 – 3.1 V (760 mm Hg/1,013 kPa)

Voltage exists

- Replace the ECM with a new one, and inspect it again

### PGM-FI MIL 2 BLINKS (MAP SENSOR)

Turn the ignition switch OFF.

Disconnect the vacuum tube from the MAP sensor.  
Connect the vacuum gauge between the throttle body and the MAP sensor using a 3-way joint.  
Start the engine and measure the manifold absolute pressure at idle speed.



Standard: 200 – 250 mm Hg

Out of range →

• Check the tube installation

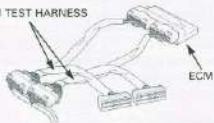
Disconnect the vacuum gauge and connect the tube to the MAP sensor.

MAP SENSOR CONNECTOR



Disconnect the ECM connectors.  
Connect the test harness to the ECM connector.

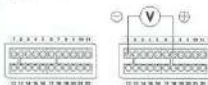
ECU TEST HARNESS



Turn the ignition switch ON.  
Measure the voltage at the test harness terminals (page 5-9).

Out of range

• Faulty MAP sensor



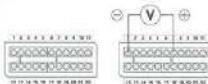
Connection: B7 (+) - B1 (-)  
Standard: 2.7 - 3.1 V (760 mm Hg/1.013 kPa)

Voltage exists

Start the engine.  
Measure the voltage at the test harness terminals (page 5-9).

Out of range

• Faulty MAP sensor

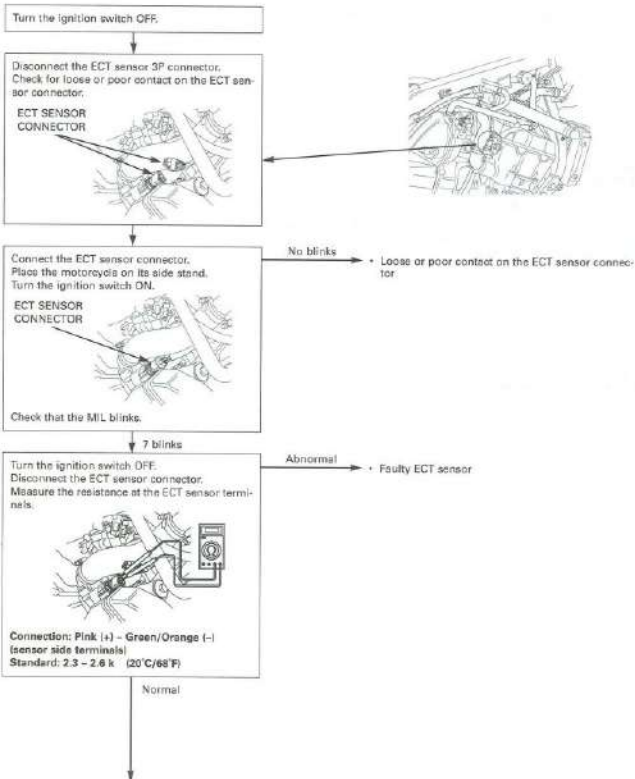


Connection: B7 (+) - B1 (-)  
Standard: 2.7 V maximum

Voltage exists

• Replace the ECM with a new one, and inspect it again

### PGM-FI MIL 7 BLINKS (ECT SENSOR)







Turn the ignition switch ON.  
Measure the voltage between the ECT sensor connector terminal of the wire harness side and ground.



Connection: Pink/White (+) – Ground (–)  
Standard: 4.75 – 5.25 V

Out of range

- Open or short circuit in Pink and Pink/White wire
- Loose or poor contacts on the ECM connector



Measure the voltage at the ECT sensor connector of the wire harness side.



Connection: Pink/White (+) – Green/Orange (–)  
Standard: 4.75 – 5.25 V

Out of range

- Open or short circuit in Green/Orange wire
- Loose or poor contacts on the ECM connector

Voltage exists

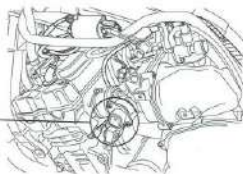
- Replace the ECM with a new one, and inspect it again

## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 8 BLINKS (TP SENSOR)

Turn the ignition switch OFF.

Disconnect the TP sensor 3P connector.  
Check for loose or poor contact on the TP sensor connector.



Connect the TP sensor connector.  
Place the motorcycle on its side stand.  
Start the engine and check that the MIL blinks.



No blinks

- Loose or poor contact on the TP sensor connector

8 blinks

Turn the ignition switch OFF.

Disconnect the TP sensor 3P connector.  
Turn the ignition switch ON.  
Measure the voltage between the wire harness side connector terminal and ground.



Connection: Yellow/Red (+) - Ground (-)  
Standard: 4.75 - 5.25 V

Out of range

- Open or short circuit in the Yellow/Red wire
- Loose or poor contact on the ECM connector

Voltage exists

Measure the voltage at the TP sensor terminals of the wire harness side.



Connection: Red/Yellow (+) - Green/Orange (-)  
Standard: 4.75 - 5.25 V

Out of range

- Open or short circuit in Green/Orange wire
- Loose or poor contact on the ECM connectors

Voltage exists

Turn the ignition switch OFF.  
Disconnect the ECM 22P connectors.



ECM

Check for continuity between the TP sensor connector terminal of the wire harness side and ground.

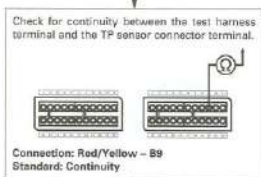
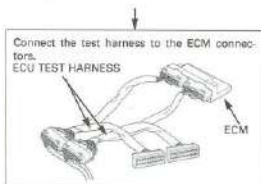


Connection: Red/Yellow (+) - Ground (-)  
Standard: No continuity

Continuity

- Short circuit in Red/Yellow wire

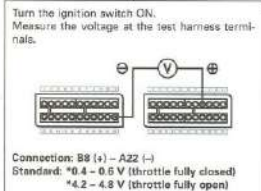
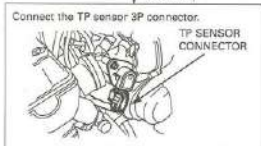
No continuity



No continuity

• Open circuit in Red/Yellow wire

Continuity



Normal

• Replace the ECM with a new one, and inspect it again

Out of range

• Faulty TP sensor

A voltage marked \* refers to the value when the voltage reading at the TP sensor 3P connector (page 5-19) shows 5 V. When the reading shows other than 5 V, derive a voltage at the test harness as follows:

In the case of a voltage of 4.75 V at the TP sensor 3P connector:

$$0.4 \times 4.75/5.0 = 0.38 \text{ V}$$

$$0.6 \times 4.75/5.0 = 0.57 \text{ V}$$

Thus, the solution is "0.38 – 0.57 V" with the throttle fully closed.

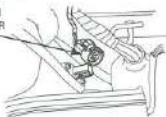
Replace 0.4 and 0.6 with 4.2 and 4.8 respectively, in the above equations to determine the throttle fully open range.

### PGM-FI MIL 9 BLINKS (IAT SENSOR)

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.  
Check for loose or poor contact on the IAT sensor connector.

IAT SENSOR  
CONNECTOR



Connect the IAT sensor 2P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch ON.  
Check that the MIL blinks.



9 blinks

Turn the ignition switch OFF.

Disconnect the IAT sensor 2P connector.  
Measure the resistance at the IAT sensor (at 20 – 30 °C/88 – 86 °F).



Standard: 1 – 4 k

Normal

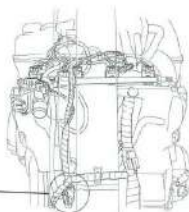
Turn the ignition switch ON.

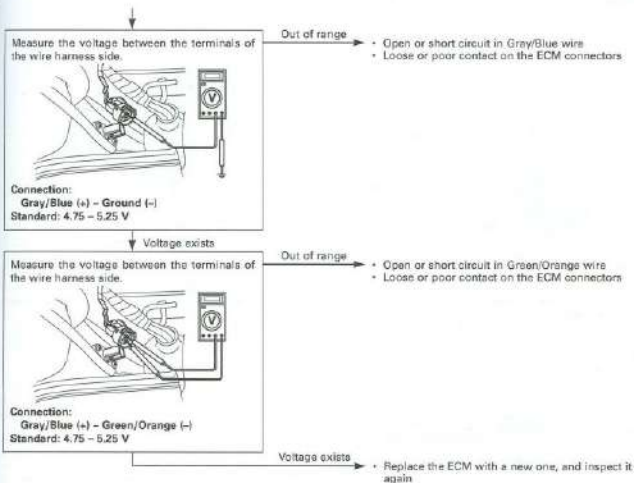
No blinks

• Loose or poor contact on the IAT sensor connector

Abnormal

• Faulty IAT sensor

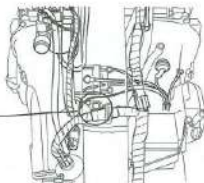
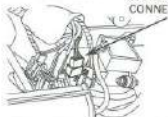




### PGM-FI MIL 11 BLINKS (VEHICLE SPEED SENSOR)

Turn the ignition switch OFF.

Disconnect the vehicle speed sensor 3P connector.  
Check for loose or poor contact on the vehicle speed sensor connector.



Connect the vehicle speed sensor 3P connector.  
Start the engine.  
Ride the motorcycle and keep the engine rev more than  $5,000 \text{ min}^{-1}$  (rpm) about 20 seconds or more.  
Put the side stand down, and check that the MIL blinks.

No blinks

- Loose or poor contact on the vehicle speed sensor connector

11 blinks

Turn the ignition switch OFF.

Disconnect the vehicle speed sensor 3P connector.  
Turn the ignition switch ON.  
Measure the voltage at the wire harness side connector.

Out of range

- Open or short circuit in Black wire of the engine sub-harness
- Open or short circuit in Black/Brown wire of the main wire harness



Connection: Black /Brown(+) - Green (-)  
Standard: 12 V

Voltage exists

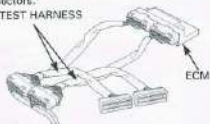


Connect the speed sensor 3P connector.

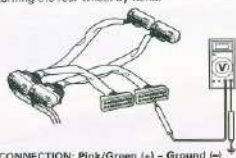


Disconnect the ECM connectors.  
Connect the test harness to the wire harness connectors.

ECU TEST HARNESS



Support the motorcycle securely and place the rear wheel off the ground.  
Shift the transmission into gear.  
Measure the voltage at the test harness terminals with the ignition switch is ON while slowly turning the rear wheel by hand.



CONNECTION: Pink/Green (+) - Ground (-)  
STANDARD: Repeat 0 to 5V

Abnormal

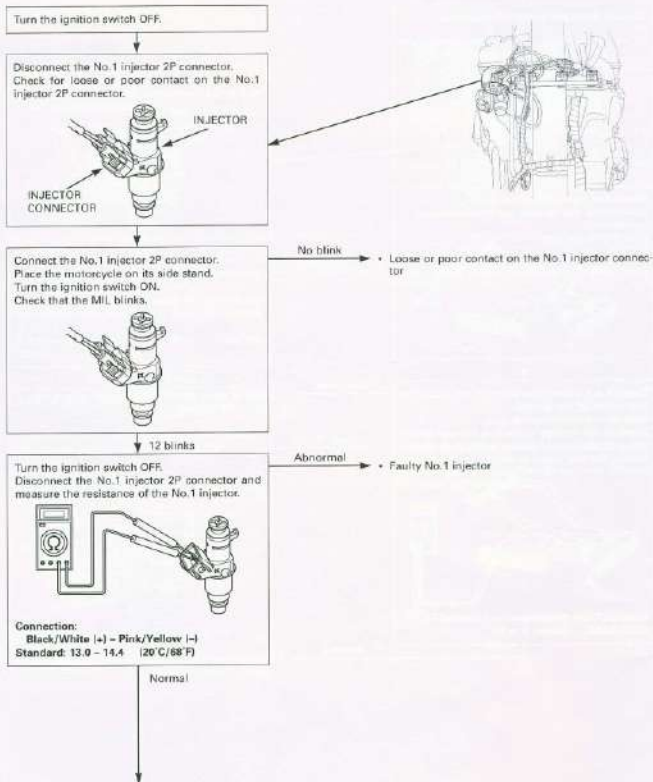
- Open or short circuit in Pink/Green wire of the main wire harness

Normal

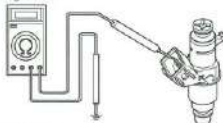
- Replace the ECM with a new one, and inspect it again

## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 12 BLINKS (No.1 INJECTOR)



Check for continuity between the No.1 injector and ground.

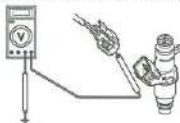


Connection:  
Black/White (+) - Ground (-)  
Standard: No continuity

Continuity

• Faulty No.1 injector

No continuity  
Turn the ignition switch ON.  
Measure the voltage between the No.1 injector connector of the wire harness side and ground.



Connection:  
Black/White (+) - Ground (-)  
Standard: Battery voltage

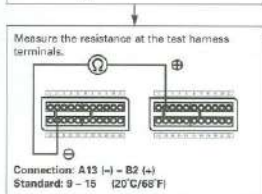
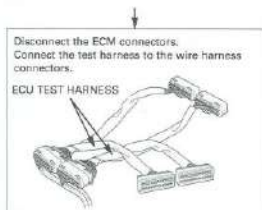
Out of range

• Open or short circuit in Black/White wire

Voltage exists

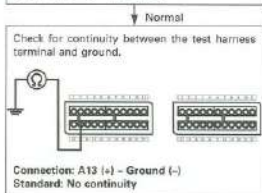
Turn the ignition switch OFF.  
Connect the No.1 injector connector.





Out of range

- Open circuit in Black/White and/or Pink/Yellow wire



Continuity

- Short circuit in Pink/Yellow wire

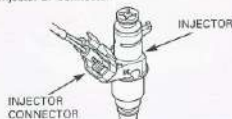
No continuity

- Replace the ECM with a new one, and inspect it again

## PGM-FI MIL 13 BLINKS (No.2 INJECTOR)

Turn the ignition switch OFF.

Disconnect the No.2 injector 2P connector.  
Check for loose or poor contact on the No.2 injector 2P connector.



Connect the No.2 injector 2P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch ON.  
Check that the MIL blinks.



No blinks

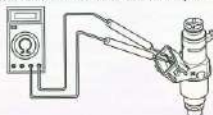
• Loose or poor contact on the No.2 injector connector

13 blinks

Turn the ignition switch OFF.  
Disconnect the No.2 injector 2P connector and  
measure the resistance of the No.2 injector.

Abnormal

• Faulty No.2 injector



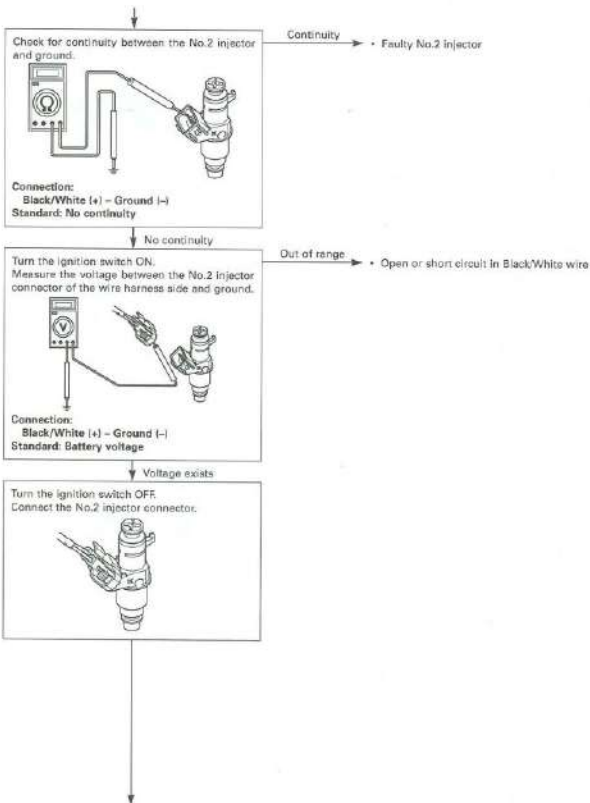
Connection:

Black/White (+) - Pink/Blue (-)  
Standard: 11.1 - 12.3 (20°C/68°F)

Normal

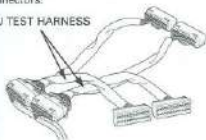


## FUEL SYSTEM (Programmed Fuel Injection)

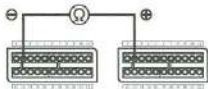


Disconnect the ECM connectors.  
Connect the test harness to the wire harness connectors.

ECU TEST HARNESS



Measure the resistance at the test harness terminals.



Connection: A2 (-) - B2 (+)  
Standard: 9 - 15 ( $20^{\circ}\text{C}/68^{\circ}\text{F}$ )

Out of range

• Open circuit in Black/White and/or Pink/Blue wire

Normal

Check for continuity between the test harness terminal and ground.



Connection: A2 - Ground  
Standard: No continuity

Continuity

• Short circuit in Pink/Blue wire

No continuity

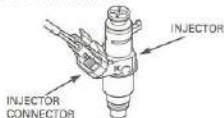
• Replace the ECM with a new one, and inspect it again

## FUEL SYSTEM (Programmed Fuel Injection)

### PGM-FI MIL 14 BLINKS (No.3 INJECTOR)

Turn the ignition switch OFF.

Disconnect the No.3 injector 2P connector.  
Check for loose or poor contact on the No.3 injector 2P connector.



Connect the No.3 injector 2P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch ON.  
Check that the MIL blinks.

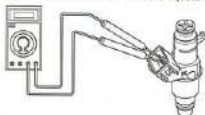


No blinks

• Loose or poor contact on the No.3 injector connector

14 blinks

Turn the ignition switch OFF.  
Disconnect the No.3 injector 2P connector and  
measure the resistance of the No.3 injector.



Connection:

Black/White (+) - Pink/Green (-)

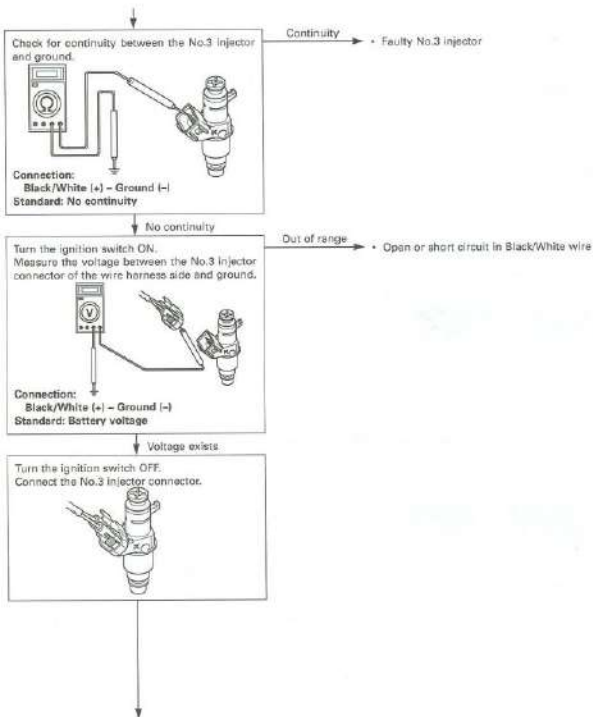
Standard: 13.0 - 14.4 (20°C/68°F)

Abnormal

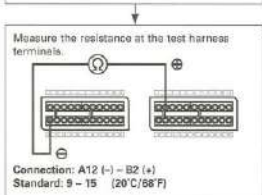
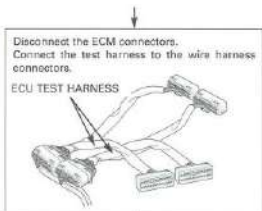
• Faulty No.3 injector

Normal



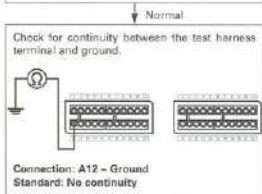


## FUEL SYSTEM (Programmed Fuel Injection)



Out of range

- Open circuit in Black/White and/or Pink/Green wire



Continuity

- Short circuit in Pink/Green wire

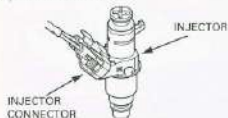
No continuity

- Replace the ECM with a new one, and inspect it again

## PGM-FI MIL 15 BLINKS (No.4 INJECTOR)

Turn the ignition switch OFF.

Disconnect the No.4 injector 2P connector.  
Check for loose or poor contact on the No.4 injector 2P connector.

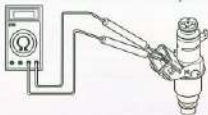


Connect the No.4 injector 2P connector.  
Place the motorcycle on its side stand.  
Turn the ignition switch ON.  
Check that the MIL blinks.



15 blinks

Turn the ignition switch OFF.  
Disconnect the No.4 injector 2P connector and  
measure the resistance of the No.4 injector.



Connection:

Black/White (+) - Pink/Black (-)  
Standard: 13.0 - 14.4 (20°C/68°F)

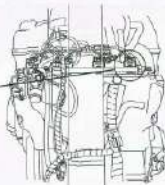
Normal

No blinks

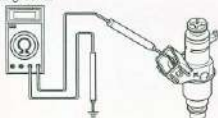
• Loose or poor contact on the No.4 injector connector

Abnormal

• Faulty No.4 injector



Check for continuity between the No.4 injector and ground.



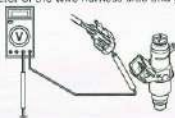
Connection:  
Black/White (+) - Ground (-)  
Standard: No continuity

Continuity

• Faulty No.4 injector

No continuity

Turn the ignition switch ON.  
Measure the voltage between the No.4 injector connector of the wire harness side and ground.



Connection:  
Black/White (+) - Ground (-)  
Standard: Battery voltage

Out of range

• Open or short circuit in Black/White wire

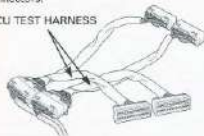
Voltage exists

Turn the ignition switch OFF.  
Connect the No.4 injector connector.



Disconnect the ECM connectors.  
Connect the test harness to the wire harness connectors.

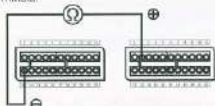
ECU TEST HARNESS



Measure the resistance at the test harness terminals.

Out of range

• Open circuit in Black/White and/or Pink/Black wire

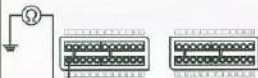


Connection: A12 (-) ~ B2 (+)  
Standard: 9 - 15 (20°C/68°F)

Normal  
Check for continuity between the test harness terminal and ground.

Continuity

• Short circuit in Pink/Black wire



Connection: A12 - Ground  
Standard: No continuity

No continuity

• Replace the ECM with a new one, and inspect it again

### PGM-FI MIL 18 BLINKS (CAM PULSE GENERATOR)

Turn the ignition switch OFF.

Disconnect the cam pulse generator 2P connector.  
Check for loose or poor contact on the cam pulse generator 2P connector.



CAM PULSE GENERATOR CONNECTOR

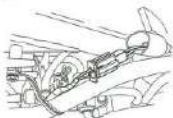
Connect the cam pulse generator 2P connector.  
Place the motorcycle on its side stand.  
Turn the starter motor more than 10 seconds and then check that the MIL blinks.

No blinks

- Loose or poor contact on the cam pulse generator 2P connector

18 blinks

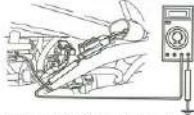
Turn the ignition switch OFF and the engine stop switch OFF.  
Disconnect the cam pulse generator 2P connector.



Check the continuity between the cam pulse generator connector terminal and ground.

Continuity

- Faulty cam pulse generator



Connection: White/Yellow - Ground  
Standard: No continuity

No continuity

↓

Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the cam pulse generator 2P connector.



Connection: Gray (+) - White/Yellow (-)  
Standard: 0.7 V minimum (20°C/68°F)

Out of range →

- Faulty cam pulse generator

↓ Normal

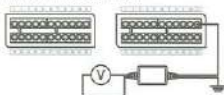
Connect the cam pulse generator 2P connector.  
Disconnect the ECM connectors.  
Connect the test harness to ECM connectors.

ECU TEST HARNESS



↓

Crank the engine with the starter motor, and measure the cam pulse generator peak voltage at the test harness terminals.



Connection: B11 (+) - Ground (-)  
Standard: 0.7 V minimum (20°C/68°F)

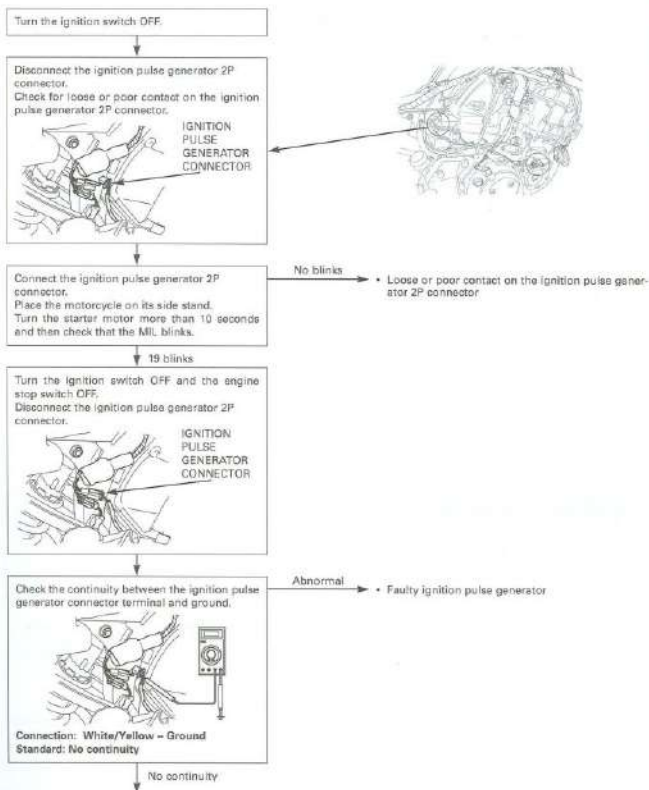
Out of range →

- Open circuit in White/Yellow and/or Gray wire

↓ Normal

- Replace the ECM with a new one, and inspect it again.

## PGM-FI MIL 19 BLINKS (IGNITION PULSE GENERATOR)





↓

Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the ignition pulse generator 2P connector.

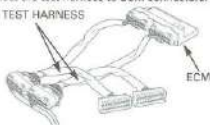
Out of range → • Faulty ignition pulse generator



Connection: Yellow (+) – Yellow/White (–)  
Standard: 0.7 V minimum (20°C/68°F)

↓ Normal

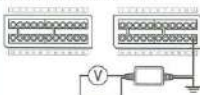
Connect the ignition pulse generator 2P connector.  
Disconnect the ECM connectors.  
Connect the test harness to ECM connectors.  
ECU TEST HARNESS



↓

Crank the engine with the starter motor, and measure the ignition pulse generator peak voltage at the test harness terminals.

Out of range → • Open circuit in White/Yellow wire  
• Open circuit in Yellow wire

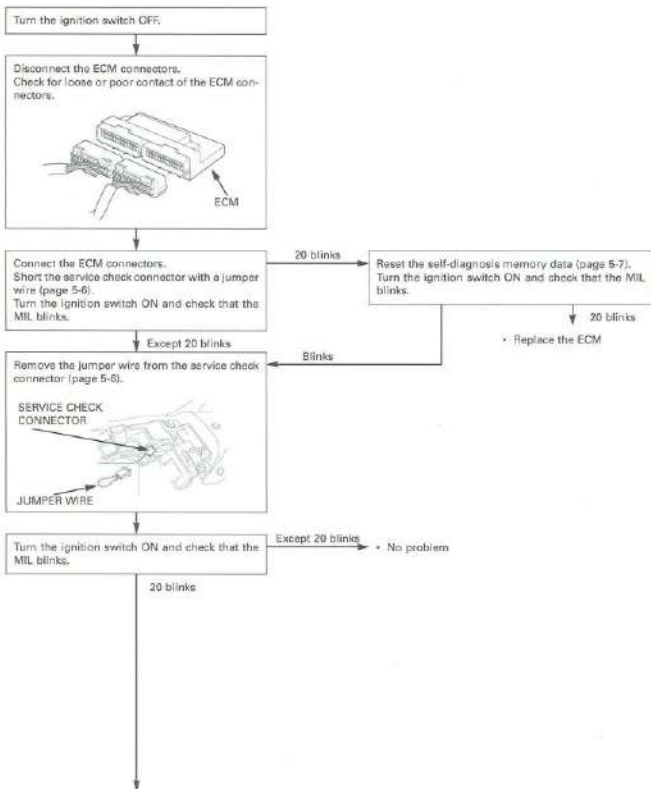


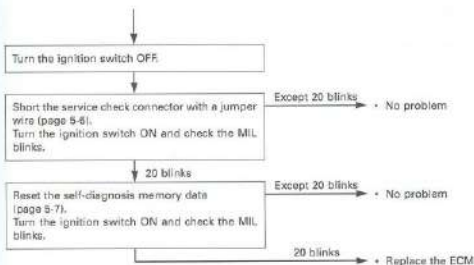
Connection: B11 (+) – Ground (–)  
Standard: 0.7 V minimum (20°C/68°F)

↓ Normal

• Replace the ECM with a new one, and inspect it again.

### PGM-FI MIL 20 BLINKS (E<sup>2</sup>-PROM)





## FUEL LINE INSPECTION

### FUEL PRESSURE INSPECTION

#### NOTICE

- Before disconnecting fuel tubes, release the fuel pressure by loosening the service check bolt at the fuel tank.
- Always replace the sealing washers when the service check bolt is removed or loosened.

Open and support the front end of the fuel tank (page 3-4).

Remove the air cleaner housing side cover (page 2-2).

Unhook the battery cover retainers, then open the battery cover.

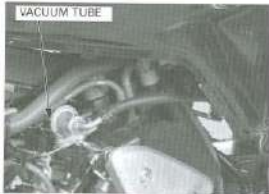
Disconnect the battery negative cable from the battery terminal.

NEGATIVE CABLE



Disconnect the pressure regulator vacuum tube and plug the vacuum tube.

VACUUM TUBE



Cover the fuel hose sealing nut with a rag or shop towel.

Slowly loosen the fuel hose sealing nut and catch the remaining fuel using an approved gasoline container.

SEALING NUT

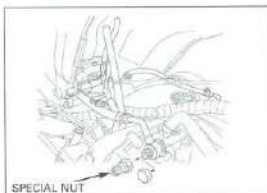


Remove the fuel tube sealing nut.  
Install the special nut (Honda Genuine part) and attach the fuel pressure gauge.

**Special nut:** Part No. 90201-90A-003

**TOOL:**

**Fuel pressure gauge** 07406-0040002  
or  
07406-0040003

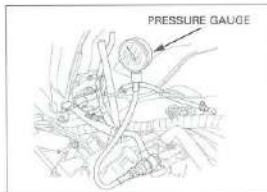


Connect the battery negative cable.  
Start the engine.  
Read the fuel pressure at idle speed.

**IDLE SPEED:** 1,200 ± 100 min<sup>-1</sup> (rpm)  
**STANDARD:** 343 kPa (3.5 kgf/cm<sup>2</sup>, 50 psi)

If the fuel pressure is higher than specified, inspect the following:

- Pinched or clogged fuel return hose
- Pressure regulator
- Fuel pump (page 5-47)



If the fuel pressure is lower than specified, inspect the following:

- Fuel line leaking
- Clogged fuel filter
- Pressure regulator
- Fuel pump (page 5-47)

*Always replace the sealing washer when the fuel rail sealing nut is removed or loosened.*

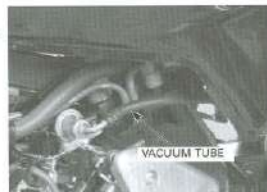
After inspection, remove the fuel pressure gauge and reinstall and tighten the fuel hose sealing nut using the new sealing washer.

**TORQUE:** 22 N·m (2.2 kgf-m, 16 lbf-ft)



Connect the pressure regulator vacuum tube.

Install the removed parts in the reverse order of removal.



### FUEL FLOW INSPECTION

Remove the seat (page 2-2).  
Open and support the front end of the fuel tank (page 3-15).

Disconnect the fuel cut relay connector.

*Check the wire color when you select the fuel cut relay.*

Jump the Brown and Black/White wire terminals of the wire harness side using a jumper wire.

- When the fuel return hose is disconnected, gasoline will spill out from the hose. Use an approved gasoline container to drain the gasoline.
- Wipe off spilled gasoline.

Disconnect the fuel return hose at the fuel tank, plug the fuel tank inlet joint.

Turn the ignition switch ON for 10 seconds.  
Measure the amount of fuel flow.

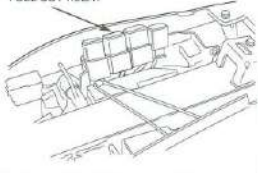
**Amount of fuel flow:**  
256 cm<sup>3</sup> (8.7 US oz, 9.0 Imp oz) minimum  
/10 seconds at 12 V

If the fuel flow is less than specified, inspect the following:

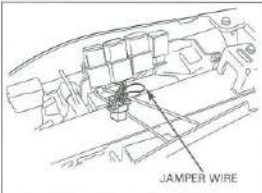
- Pinched or clogged fuel hose and fuel return hose
- Clogged fuel filter
- Pressure regulator
- Fuel pump (page 5-47)

After inspection, connect the fuel return hose.  
Start the engine and check for leaks.

FUEL CUT RELAY



JAMPER WIRE



FUEL RETURN TUBE



## FUEL PUMP

## INSPECTION

Turn the ignition switch ON and confirm that the fuel pump operates for a few seconds.  
If the fuel pump does not operate, inspect as follows:

Open and support the front end of the fuel tank (page 3-15).

Disconnect the fuel pump 3P connector.

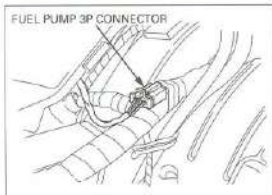
Turn the ignition switch ON and measure the voltage between the terminals.

**Connection:** Brown (+) – Green (–)

There should be battery voltage for a few seconds.

If there is battery voltage, replace the fuel pump.  
If there is no battery voltage, inspect the following:

- Main fuse 30A
- Sub fuse 10A
- Engine stop switch (page 19-19)
- Fuel cut relay (page 5-48)
- Engine stop relay (page 5-76)
- Bank angle sensor (page 5-75)
- ECM (page 5-76)



## REMOVAL

## NOTE:

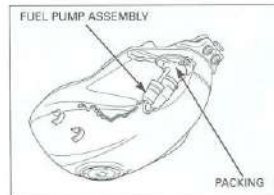
- Before disconnecting the fuel hose, release the fuel pressure by loosening the fuel hose sealing nut at the throttle body.
- Always replace the sealing washers when the fuel hose sealing nut is removed or loosened.

Remove the fuel tank (page 5-49).

Remove the fuel pump mounting nuts.



Remove the fuel pump assembly and packing.



## FUEL SYSTEM (Programmed Fuel Injection)

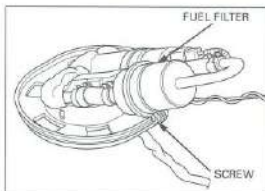
### FUEL FILTER REPLACEMENT

Disconnect the fuel tubes from the fuel filter.  
Remove the screws and fuel filter.

*Note the direction  
of the fuel filter.*

*Do not damage  
the fuel return  
sensor.*

Install the fuel filter in the reverse order of removal.

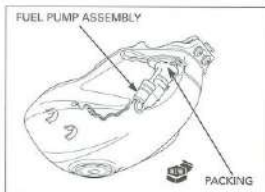


### INSTALLATION

*Always replace  
packing with a  
new one.*

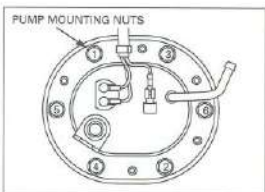
Place new packing onto the fuel tank.

Install the fuel pump, being careful not to damage the  
fuel pump wire.



Install and tighten the fuel pump mounting nuts in the  
sequence shown.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



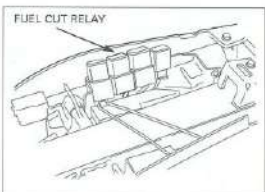
## FUEL CUT RELAY

### INSPECTION

Remove the rear cowl (page 2-3).

*Check the wire  
color when you  
select the fuel cut  
relay.*

Disconnect the fuel cut relay 4P connector, remove  
the fuel cut relay.





Connect the ohmmeter to the fuel cut relay connector terminals.

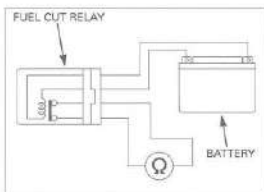
**CONNECTION: Black/White – Brown**

Connect the 12V battery to the following fuel cut relay connector terminals.

**CONNECTION: Brown/Black – Black/White**

There should be continuity only when the 12V battery is connected.

If there is no continuity when the 12V battery is connected, replace the fuel cut relay.

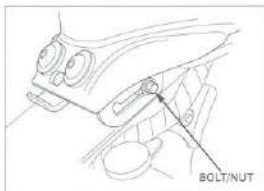


## FUEL TANK

### REMOVAL

Remove the side cover (page 2-2).

Loosen the fuel tank mounting bolt/nut.



*Do not remove the maintenance wire bolt yet.*

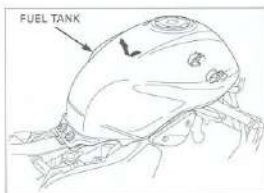
Slide the fuel tank to the backward.

Open the front end of the fuel tank and support it using a suitable support.

Tighten the fuel tank mounting bolt/nut to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Release the fuel pressure (page 5-44).



Disconnect the fuel tank air vent hose and overflow tube.

Remove the fuel hose sealing nut and sealing washers, then disconnect the fuel hose (page 5-44).

**NOTE:**

- Do not apply excessive force to the fuel pipe.
- Always hold the fuel pipe nut while removing the fuel hose sealing nut.

Temporarily install the 12 X 30 mm bolt (pitch 1.25) and sealing washers to the fuel hose banjo, then tighten the sealing nut.



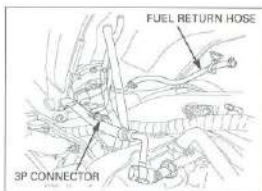
## FUEL SYSTEM (Programmed Fuel Injection)

Remove the following:

- fuel tank over flow hose
- fuel tank air vent hose
- fuel pump/pressure sensor 3P connector

Clamp the fuel return hose.

Disconnect the fuel return hose at the pressure regulator.

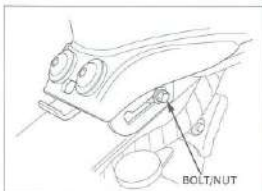


Remove the bolt and maintenance wire.



Close the fuel tank.

Remove the fuel tank mounting bolt/nut and fuel tank.



Place the fuel tank upside down.

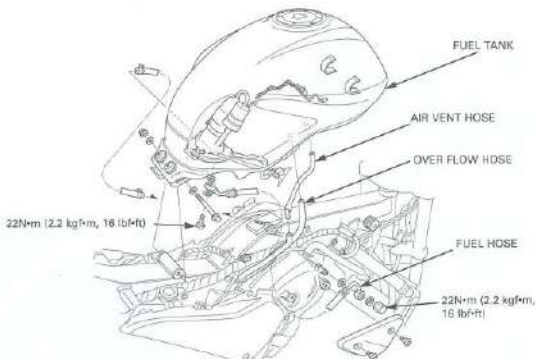
### NOTICE

*Do not damage the fuel tank.*

Disconnect the fuel return tube from the fuel pump. Remove the fuel hose banjo bolt and sealing washers, then remove the fuel hose from the fuel pump.

Refer to page 5-47 for fuel pump removal.





Connect the fuel hose to the fuel pump with new sealing washers.

Install and tighten the fuel hose banjo bolt to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

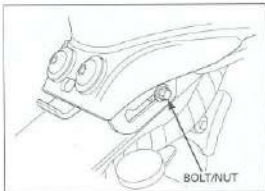
Connect the fuel return hose to the fuel pump.



*Align the fuel hose eyelet joint with the stopper on the fuel pump.*

Install the fuel tank onto the frame. Loosely install the fuel tank mounting bolt/nut.

Support the front end of the fuel tank.

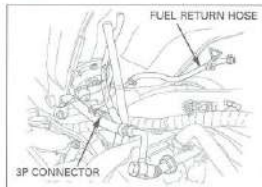


## FUEL SYSTEM (Programmed Fuel Injection)

Install the following:

- fuel tank over flow hose
- fuel tank air vent hose
- fuel pump/pressure sensor 3P connector

Connect the fuel return tube to the pressure regulator.  
Connect the fuel pump/pressure sensor 3P (Black) connector.



Install and tighten the fuel tank maintenance bolt.  
Support the front end of the fuel tank.



Connect the fuel hose banjo to the throttle body with new sealing washers.  
While pushing the fuel hose banjo stopper to the throttle body, install and tighten the sealing nut to the specified torque.

NOTE:

- Do not apply excessive force to the fuel pipe.
- Always hold the fuel pipe nut while tightening the fuel hose sealing nut.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

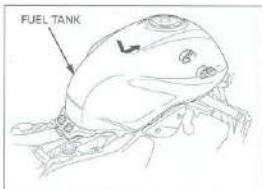


Remove the supporting tool and close the fuel tank.

Slide the fuel tank forward and install the fuel tank stay to the frame rubber.  
Tighten the fuel tank mounting bolt/nut to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Install the side cover (page 2-2).



## AIR CLEANER HOUSING

## REMOVAL

Remove the throttle cables from the right handlebar switch housing (page 13-3).

Remove the following:

- fuel tank (page 5-49)
- air cleaner element (page 3-5)

Remove the vacuum tubes from the intake air duct control solenoid valve.

Disconnect the intake air duct control solenoid valve 2P connector.

Disconnect the cam pulse generator 2P connector.

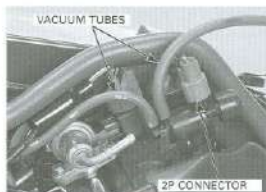
Disconnect the crankcase breather tube from the air cleaner housing.

California type only: Disconnect the No.5 tube from the five way joint.

Disconnect the fuel injector 8P connector.

Disconnect the No.4 fuel injector 2P connector.

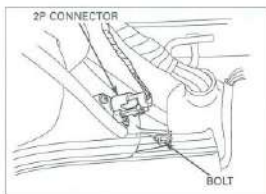
Remove the starter valve knob stay bolt.



## FUEL SYSTEM (Programmed Fuel Injection)

Remove the IAT sensor 2P connector.

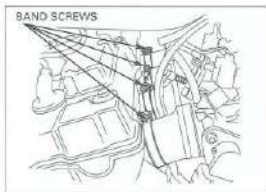
Remove the air cleaner housing mounting bolt.



Loosen the insulator band screws (cylinder head side).  
Disconnect the throttle body from the cylinder head.  
Remove the air cleaner housing/throttle body from the left side of the frame.

### NOTE:

Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.



## DISASSEMBLY

Remove the vacuum tube from the one-way valve.

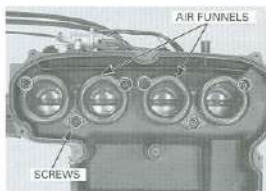


Remove the screws from the air cleaner housing and separate the housing.



Remove the air funnel mounting screws, then remove the air funnels.

Remove the air cleaner housing.



## ASSEMBLY

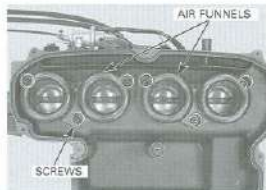
Check the rubber seals for damage and replace if necessary.

Check the rubber seals (air cleaner housing mating surface side) for damage and replace if necessary.

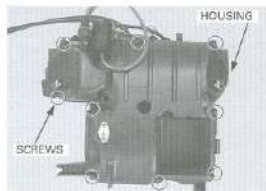


Check the rubber seals (air cleaner housing mating surface side) for damage and replace if necessary.

Install the air cleaner housing onto the throttle body. Install the air funnels in their proper locations. Install and tighten the air funnel mounting screws securely.



Assemble the air cleaner housing halves. Install and tighten the screws securely.



Connect the vacuum tube to the one-way valve.

Connect the crankcase breather tube to the air cleaner housing.

Connect the PAIR control valve air suction tube and intake vacuum tubes to the air cleaner housing.

Connect the MAP sensor connector and vacuum tube.



### INSTALLATION

Install the air cleaner housing/throttle body from the left side of the frame.

Tighten the cylinder head side insulator band so that the insulator band distance is  $4 \pm 1$  mm ( $0.2 \pm 0.04$  in.).

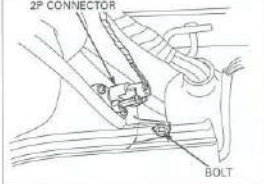
$4 \pm 1$  mm ( $0.2 \pm 0.04$  in.)



Install the IAT sensor 2P connector.

Install the air cleaner housing mounting bolt.

2P CONNECTOR

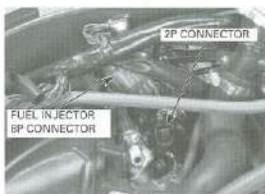


Install and tighten the by-starter valve knob stay bolt.





Connect the fuel injector 8P connector.  
Connect the No.4 fuel injector 2P connector.



Connect the crankcase breather tube to the air cleaner housing.

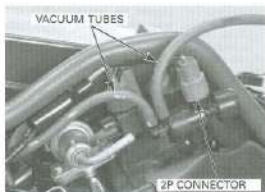


Install the vacuum tubes to the intake air duct control solenoid valve.

Connect the intake air duct control solenoid valve 2P connector.  
Connect the cam pulse generator 2P connector.

Install the following:  
- air cleaner element (page 3-5)  
- fuel tank (page 5-51)

Connect the throttle cables to the throttle pipe (page 13-9).



## THROTTLE BODY

### REMOVAL

#### NOTE:

- Before disconnecting the fuel hose, release the fuel pressure by loosening the service check bolt.
- Always replace the sealing washer when the service check bolt is removed or loosened.

### DISASSEMBLY

Remove the throttle body sub-harness from the TP (Throttle position) sensor.

Disconnect the fuel injector connector from the throttle body.



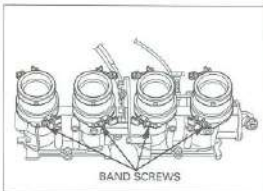
Refer to page 5-54 for removal of the throttle body.

Disconnect the vacuum tubes from the throttle body.



Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.

Loosen the insulator band screws and remove the insulators from the throttle body.

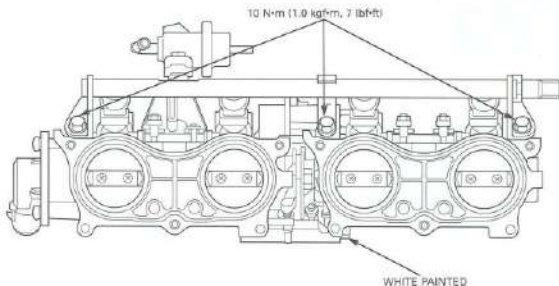
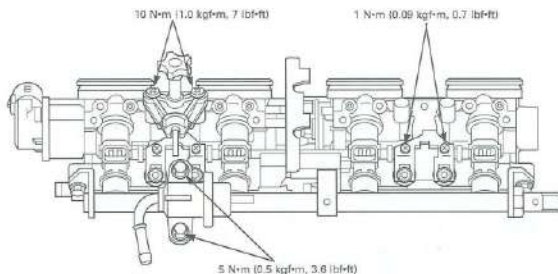


Disconnect the throttle cable ends from the throttle drum.



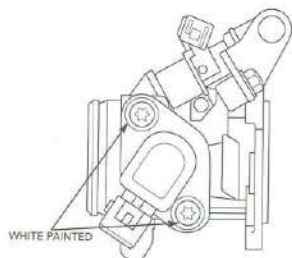
**NOTICE**

- Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.
- The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.
- Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.

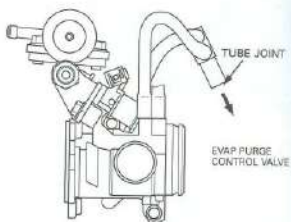
**TOP VIEW:****REAR VIEW:**

## FUEL SYSTEM (Programmed Fuel Injection)

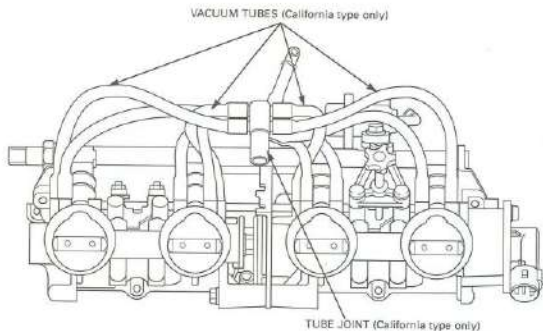
RIGHT SIDE VIEW:



CALIFORNIA TYPE ONLY:



## THROTTLE BODY VACUUM TUBE ROUTING

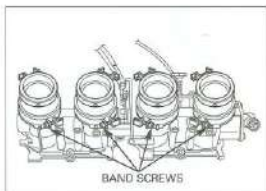


## ASSEMBLY

Connect the throttle cable ends to the throttle drum.



Check the insulator band angle.  
Install the insulators onto the throttle body.



Tighten the throttle body side insulator band so that the insulator band distance is  $7 \pm 1$  mm ( $0.3 \pm 0.04$  in.).

Apply oil to the insulator inside surfaces for ease of throttle body installation.



Connect the vacuum tube to the throttle body.



## FUEL SYSTEM (Programmed Fuel Injection)

Route the throttle body sub-harness properly and connect the injector connectors and TP sensor connector.

Install the throttle body to the air cleaner case (page 5-55).

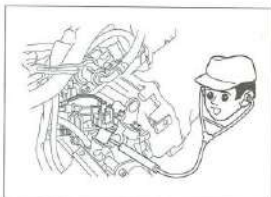


## INJECTOR

### INSPECTION

Start the engine and let it idle.  
Confirm the injector operating sounds with a sounding rod or stethoscope.

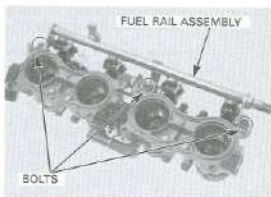
If the injector does not operate, replace the injector.



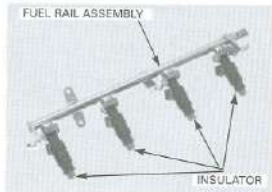
### REMOVAL

Remove the throttle body (page 5-58).

Remove the bolts and fuel rail assembly.



Remove the injectors from the fuel rail.

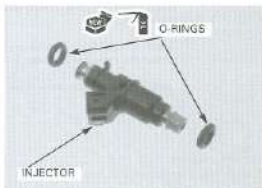


Remove the O-rings.

## INSTALLATION

*Replace the O-rings with new ones as a set.*

Apply oil to the new O-rings. Install the new O-rings and being careful not to damage the O-ring.



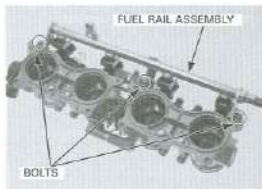
Install the fuel injectors into the fuel rail, being careful not to damage the O-rings.



Install the fuel rail assembly onto the throttle body, being careful not to damage the O-rings. Install and tighten the fuel rail mounting bolts to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Install the throttle body (page 5-65).



## PRESSURE REGULATOR

### REMOVAL/INSTALLATION

#### NOTE:

Do not apply excessive force to the fuel rail.

Hold the fuel rail securely, remove the pressure regulator mounting bolts, then remove the pressure regulator.



## FUEL SYSTEM (Programmed Fuel Injection)

Disconnect the vacuum tube from the pressure regulator.

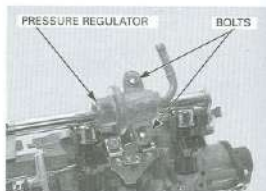
Install a new O-ring into the pressure regulator body. Install the pressure regulator onto the fuel pipe.

Connect the vacuum tube to the pressure regulator.



Hold the fuel pipe securely, tighten the pressure regulator mounting bolts to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



## STARTER VALVE CABLE/THROTTLE STOP CONTROL KNOB

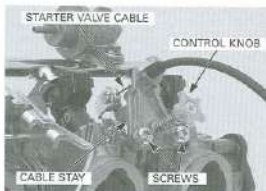
### REMOVAL

*Do not turn the throttle stop control knob.*

Remove the cable stay mounting screws.

Remove the starter valve cable end from the link arm.

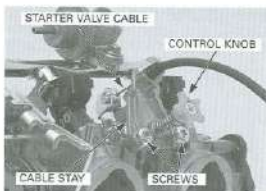
Remove the cable stay/throttle stop control knob.



### INSTALLATION

Connect the starter valve cable end to the link arm.

Install the starter valve cable to the cable stay and tighten the cable stay mounting screws securely.



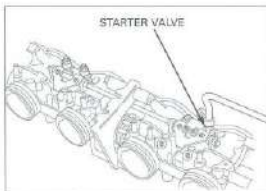


## STARTER VALVE

### DISASSEMBLY

Remove the fuel rail and injectors (page 5-62).

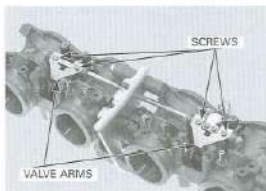
Turn each starter valve adjusting screw in, counting the number of turns until it seats lightly. Record the number of turns.



### STARTER VALVE ARM

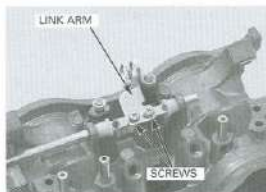
Remove the starter valve cable/throttle stop control knob (page 5-62).

Remove the starter valve arm screws and starter valve arm.

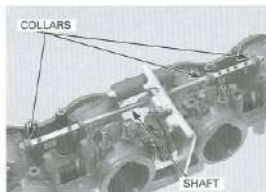


### LINK ARM

Remove the screws and link arm.



Remove the starter valve shaft and three collars.



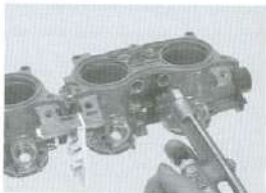
## FUEL SYSTEM (Programmed Fuel Injection)

Loosen the lock nut and remove the starter valve assembly.

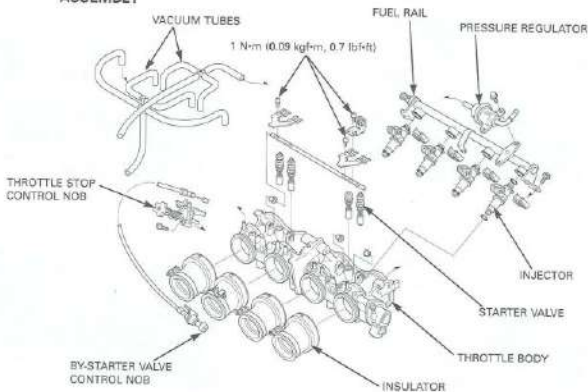


*Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.*

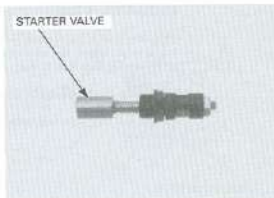
Clean the starter valve bypass using compressed air.



### ASSEMBLY



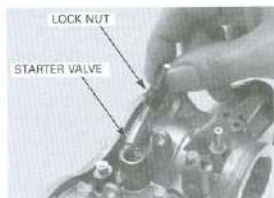
Check the starter valve and spring for damage.



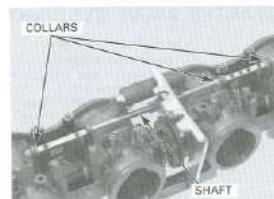
Install the starter valve assembly into the valve hole.

Tighten the starter valve lock nut to the specified torque.

**TORQUE: 2 N·m (0.18 kgf·m, 1.3 lbf·ft)**



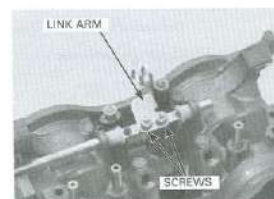
Install the starter valve shaft and three collars.



#### **LINK ARM**

Install the link arm to the starter valve shaft and tighten the mounting screws to the specified torque.

**TORQUE: 1 N·m (0.09 kgf·m, 0.7 lbf·ft)**



## FUEL SYSTEM (Programmed Fuel Injection)

### STARTER VALVE ARM

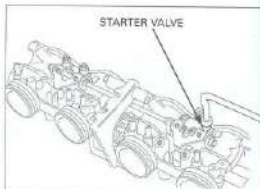
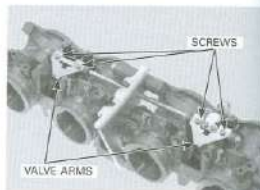
Install the starter valve arms onto the starter valves. Install and tighten the starter valve arm mounting screws to the specified torque.

**TORQUE:** 1 N·m (0.09 kgf·m, 0.7 lbf·ft)

Install the starter valve cable/throttle stop control nob (page 5-64).

Turn the starter valve screw until it seats lightly, then back it out as noted during removal.

Install the throttle body (page 5-66).



## STARTER VALVE SYNCHRONIZATION

### NOTE:

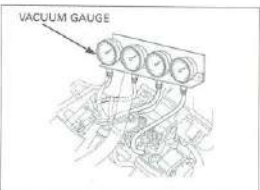
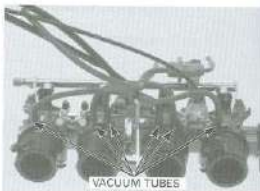
- Synchronize the starter valve with the engine at the normal operating temperature and with the transmission in neutral.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

Open and support the front end of fuel tank (page 3-15).

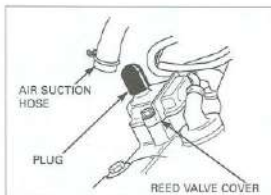
Remove the No.1 and No.4 vacuum tubes from the throttle body.

Connect the tubes to the vacuum gauge.

Connect the tachometer.



Disconnect the PAIR air suction hoses from the reed valve covers and plug the cover.



Start the engine and adjust the idle speed.

**IDLE SPEED:  $1,200 \pm 100$  min<sup>-1</sup> (rpm)**

Adjust each intake vacuum pressure with the No.2 cylinder.

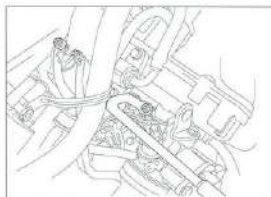
*The No.2 starter valve cannot be adjusted, it is the base starter valve.*



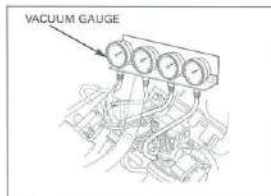
Remove the plugs and connect the PAIR air suction hoses to the reed valve covers.

Adjust the idle speed if the idle speed differs from the specified speed.

**IDLE SPEED:  $1,200 \pm 100$  min<sup>-1</sup> (rpm)**



Remove the vacuum gauge from the vacuum tubes. Connect the pressure regulator vacuum tubes to the 3-way joint. Connect the No.1 and No.4 cylinder vacuum tube to the throttle body.



## MAP SENSOR

### OUTPUT VOLTAGE INSPECTION

Connect the test harness to the ECM (page 5-8).

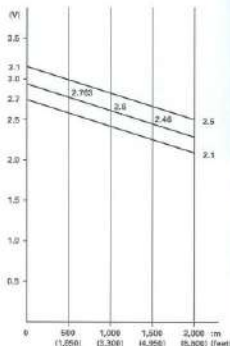
Measure the voltage at the test harness terminals (page 5-9).

**CONNECTION:** B7 (+) - B1 (-)

**STANDARD:** 2.7 - 3.1 V

The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,030 hPa). The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmosphere.

Check the sea level measurement and be sure that the measured voltage falls within the specified value.



### MAP SENSOR REMOVAL/INSTALLATION

Remove the fuel tank (page 5-49).

Disconnect the MAP sensor connector.

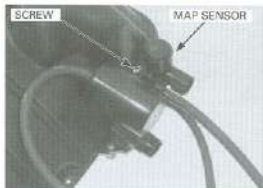
Disconnect the vacuum tube from the MAP sensor.



Remove the air cleaner housing (page 5-53).

Remove the screw and MAP sensor from the air cleaner housing.

Installation is in the reverse order of removal.



## IAT SENSOR

### REMOVAL/INSTALLATION

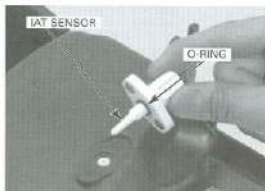
Open and support the front end of the fuel tank (page 3-4).

Disconnect the IAT sensor connector.

Remove the screws and IAT sensor from the air cleaner housing cover.

Check the O-ring for damage and replace if necessary.

Installation is in the reverse order of removal.



## ECT SENSOR

### REMOVAL/INSTALLATION

Drain the coolant from the system (page 6-5).  
Remove the thermostat (page 6-6).

Disconnect the ECT sensor connector from the sensor.

Remove the ECT sensor and sealing washer.  
Install the new sealing washer and ECT sensor.  
Tighten the ECT sensor to the specified torque.

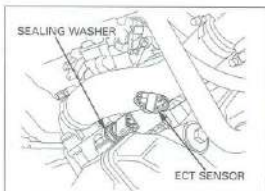
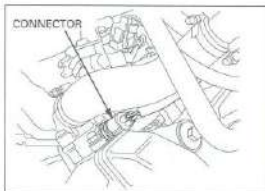
**TORQUE: 23 N·m (2.3 kgf-m, 17 lbf-ft)**

Connect the ECT sensor connector.

Fill the cooling system with recommended coolant (page 6-5).

*Replace the ECT sensor while the engine is cold.*

*Always replace a sealing washer with a new one.*



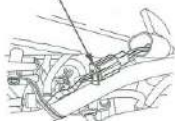
## **CAM PULSE GENERATOR**

### **REMOVAL/INSTALLATION**

Open and support the front end of fuel tank (page 3-4).

Disconnect the cam pulse generator 2P connector.

2P CONNECTOR



Remove the bolt and cam pulse generator from the cylinder head.

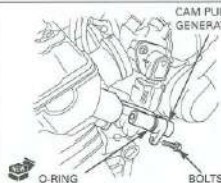
CAM PULSE GENERATOR



Install the new O-ring onto the cam pulse generator.  
Install the cam pulse generator into the cylinder head.

Install and tighten the mounting bolt securely.

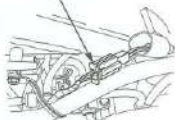
CAM PULSE GENERATOR



Route the cam pulse generator wire properly, connect the 2P connector.

Install the removed parts in the reverse order of removal.

2P CONNECTOR





## TP SENSOR

## INSPECTION

Remove the rear cowl (page 2-3).

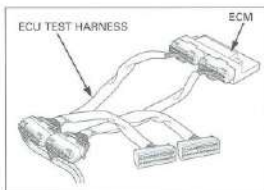
Disconnect the ECM 22P (Black) and 22P (Light gray) connectors.

Check the connector for loose or corroded terminals. Connect the ECU test harness between the ECM and main wire harness.

## TOOL:

ECU test harness

07YMZ-0010100  
(two required)



## 1. INPUT VOLTAGE INSPECTION

Turn the ignition switch ON and measure and record the input voltage at the test harness terminals using a digital multimeter.

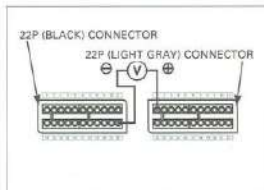
## CONNECTION:

B1 (+) - A22 (-)

Standard: 4.5 - 5.5 V

If the measurement is out of specification, check the following:

- Loose connection of the ECM multi-connector
- Open circuit in wire harness



## 2. OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY OPEN

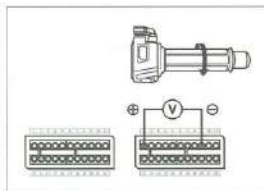
Turn the ignition switch ON and measure and record the output voltage at the test harness terminals.

## CONNECTION:

B1 (+) - B9 (-)

## MEASURING CONDITION:

At throttle fully open



## 3. OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY CLOSED

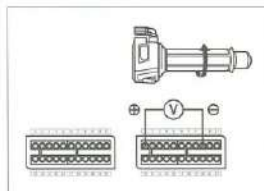
Turn the ignition switch ON and measure and record the output voltage with the throttle fully closed.

## CONNECTION:

B1 (+) - B9 (-)

## MEASURING CONDITION:

At throttle fully closed



### 4. CALCULATE RESULT COMPARISON

Compare the measurement to the result of the following calculation.

With the throttle fully open:

**Measured input voltage X 0.824 =  $V_o$**

The sensor is normal if the measurement output voltage measured in step 2 is within 10% of  $V_o$ .

With the throttle fully closed:

**Measured input voltage X 0.1 =  $V_c$**

The sensor is normal if the throttle closed output voltage measured in step 3 is within 10% of  $V_c$ .

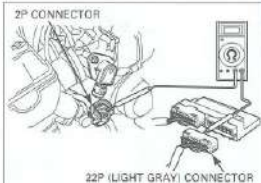
Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

### CONTINUITY INSPECTION

Open and support the front end of fuel tank (page 3-4).

Disconnect the ECM 22P (Light gray) connector and the TP sensor 3P connector. Check for continuity between the wire harness and TP sensor.

If there is no continuity, check for an open or short circuit in the wire harness.

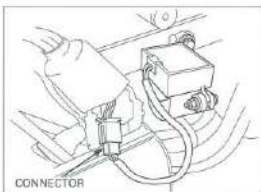


## BANK ANGLE SENSOR

### INSPECTION

Support the motorcycle on a level surface. Remove the rear cowl (page 2-3).

Turn the ignition switch ON and measure the voltage between the following terminals of the bank angle sensor connector with the connector connected.

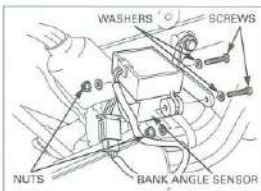


TERMINAL	STANDARD
White (+) - Green (-)	Battery voltage
Red/Green (+) - Green (-)	0 - 1 V

*Do not disconnect the bank angle sensor connector during inspection.*

Turn the ignition switch OFF.

Remove the screws, washers, nuts and bank angle sensor.



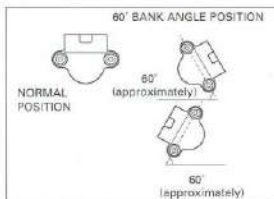
Place the bank angle sensor horizontal as shown, and turn the ignition switch ON.

The bank angle sensor is normal if the engine stop relay clicks and power supply is closed.

Incline the bank angle sensor approximately 60 degrees to the left or right with the ignition switch ON.

The bank angle sensor is normal if the engine stop relay clicks and power supply is open.

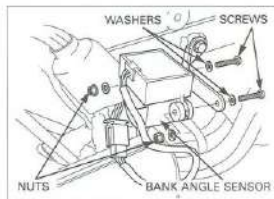
If you repeat this test, first turn the ignition switch OFF, then turn the ignition switch ON.



## REMOVAL/INSTALLATION

Disconnect the bank angle sensor 3P (Green) connector.

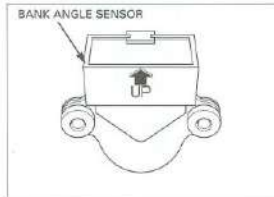
Remove the two screws, nuts and bank angle sensor.



*Install the bank angle sensor with its "UP" mark facing up.*

Installation is in the reverse order of removal.

Tighten the mounting screws securely.

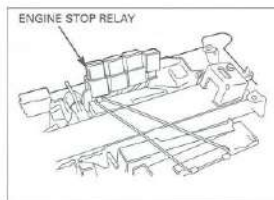


## ENGINE STOP RELAY

### INSPECTION

Disconnect the engine stop relay 4P connector.

*Check the wire color when you select the engine stop relay.*



## FUEL SYSTEM (Programmed Fuel Injection)

Connect the ohmmeter to the engine stop relay connector terminals.

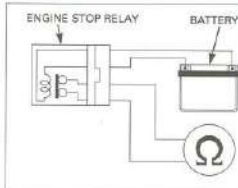
**CONNECTION:** Red/White - Black/White

Connect the 12 V battery to the following engine stop relay connector terminals.

**CONNECTION:** Red/Orange - Black

There should be continuity only when the 12 V battery is connected.

If there is no continuity when the 12 V battery is connected, replace the engine stop relay.

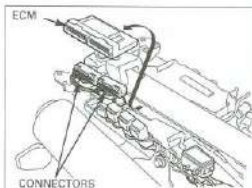


## ECM (ENGINE CONTROL MODULE)

### REMOVAL/INSTALLATION

Remove the rear cowl (page 2-2).

Disconnect the ECM 22P (Black) and 22P (Light gray) connectors.



### POWER/GROUND LINE INSPECTION

Connect the test harness between the main wire harness and ECM (page 5-7).

#### TOOL:

ECU test harness

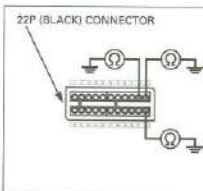
07VMZ-0010100  
(two required)

#### GROUND LINE

Check for continuity between the ECM test harness connector A9 terminal and ground, between the A20 terminal and ground, and between the A12 terminal and ground.

There should be continuity at all times.

If there is no continuity, check for an open circuit in Green/Pink wire and Green wire.



#### POWER INPUT LINE

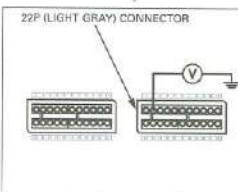
Turn the ignition switch ON with the engine stop switch in the RUN position.

Measure the voltage between the ECM test harness connector B6 terminal (+) and ground.

There should be battery voltage.

If there is no voltage, check for an open circuit in Black/White wire between the ECM and bank angle sensor/relay.

If the wire is OK, check for the bank angle sensor/relay (page 5-76).



## PAIR SOLENOID VALVE

## REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-00).

Disconnect the PAIR solenoid valve 2P (Black) connector.

2P CONNECTOR



Disconnect the PAIR air suction hose and air injection hoses.

Remove the bolt and PAIR solenoid valve.

PAIR SOLENOID VALVE

AIR INJECTION HOSES

AIR INJECTION HOSES

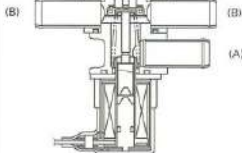


Installation is in the reverse order of removal.

## INSPECTION

Remove the PAIR solenoid valve.

Check that air flows (A) to (B) only when the 12 V battery is connected to the PAIR solenoid valve terminals.



Check the resistance between the terminals of the PAIR solenoid valve.

STANDARD: 20 – 24 (20 °C/68 °F)

If the resistance is out of specification, replace the PAIR solenoid valve.

PAIR SOLENOID VALVE



## **EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)**

Note:

- Refer to the Vacuum Hose Routing Diagram and Cable & Harness Routing (page 1-33) for the tube connections and routing.

### **EVAPORATIVE EMISSION (EVAP) CANISTER REMOVAL/INSTALLATION**

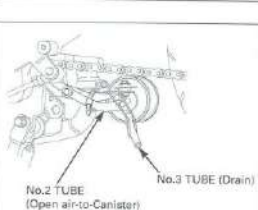
Disconnect the No.1 and No.4 tube from the EVAP canister and remove them from the clamp. Remove the bolts, nuts and the EVAP canister from the bracket.

Install the EVAP canister in the reverse order of removal.

No.1 TUBE (Fuel tank-to-Canister)



No.4 TUBE  
(Canister-to-EVAP purge control solenoid valve)



### **EVAP PURGE CONTROL SOLENOID VALVE**

#### **REMOVAL/INSTALLATION**

Disconnect the No.4 and No.5 tubes from the EVAP purge control solenoid valve. Remove the bolts, nuts and solenoid valve from the stay.

Disconnect the 2P connector from the solenoid valve.

Install the solenoid valve in the reverse order of removal.

#### **INSPECTION**

Remove the solenoid valve.

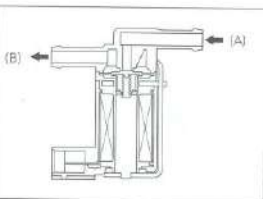
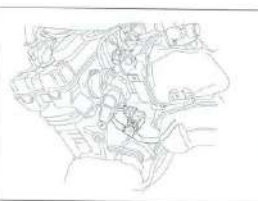
Check air flow from tube fitting (A) (input port) to tube fitting (B) (output port). Air should not flow out.

Connect the 12 V battery to the solenoid valve connector.

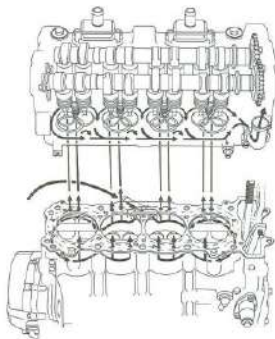
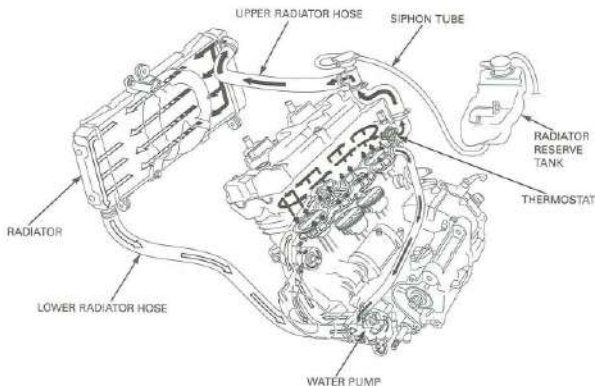
#### **CONNECTION:**

- Battery (+) - Black/White terminal
- Battery (-) - Yellow/Black terminal

Air should flow when the battery is connected.



## SYSTEM FLOW PATTERN



# 6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-0	THERMOSTAT	6-6
SERVICE INFORMATION	6-1	RADIATOR	6-7
TROUBLESHOOTING	6-2	WATER PUMP	6-12
SYSTEM TESTING	6-3	RADIATOR RESERVE TANK	6-15
COOLANT REPLACEMENT	6-4		

## SERVICE INFORMATION

### GENERAL

#### WARNING

Removing the radiator cap while the engine is hot can cause the coolant to spray out, seriously scalding you.  
Always let the engine and radiator cool down before removing the radiator cap.

- If any coolant gets in your eyes, rinse them with water and consult a doctor immediately.
- If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
- If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.

#### NOTICE

*Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages.  
Using tap water may cause engine damage.*

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 19 for fan motor relay and coolant temperature sensor inspection.



## COOLING SYSTEM

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.2 liter (3.38 US qt, 2.82 imp qt)
	Reserve tank	0.8 liter (0.85 US qt, 0.70 imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors specifically recommended for use in aluminum engines
Standard coolant concentration		50/50% mixture with soft water

### TORQUE VALUES

Water pump cover flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Thermostat cover flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
ECT/thermo sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Cooling fan mounting nut	3 N·m (0.27 kgf·m, 2.0 lbf·ft)	Apply a locking agent to the threads
Fan motor mounting nut	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	

### TROUBLESHOOTING

#### Engine temperature too high

- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor relay
- Faulty water pump

#### Engine temperature too low

- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck open
- Faulty cooling fan motor relay

#### Coolant leak

- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose

## SYSTEM TESTING

## COOLANT (HYDROMETER TEST)

Open and support the front end of fuel tank (page 3-4).

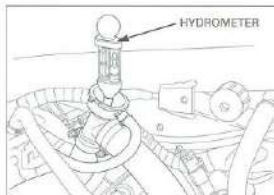
Remove the radiator cap.



Test the coolant gravity using a hydrometer (see below for "Coolant gravity chart").

For maximum corrosion protection, a 50-50% solution of ethylene glycol and distilled water is recommended (page 6-4).

Look for contamination and replace the coolant if necessary.



## COOLANT GRAVITY CHART

Coolant temperature °C (°F)	0	5	10	15	20	25	30	35	40	45	50
Coolant ratio %	(32)	(41)	(50)	(59)	(68)	(77)	(86)	(95)	(104)	(113)	(122)
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.029	1.025
30	1.053	1.052	1.051	1.047	1.046	1.045	1.043	1.041	1.038	1.035	1.032
35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

### RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Before installing the cap in the tester, wet the seating surfaces.

Remove the radiator cap (see previous page).

Pressure test the radiator cap.

Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least 6 seconds.

#### RADIATOR CAP RELIEF PRESSURE:

108 – 127 kPa (1.1 – 1.4 kgf/cm<sup>2</sup>, 16 – 20 psi)

Pressure the radiator, engine and hoses, and check for leaks.

#### NOTICE

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm<sup>2</sup>, 20 psi).

Repair or replace components if the system will not hold specified pressure for at least 6 seconds.



## COOLANT REPLACEMENT

### PREPARATION

- The effectiveness of coolant decreases with the accumulation of rust or if there is a change in the mixing proportion during usage. Therefore, for best performance change the coolant regularly as specified in the maintenance schedule.
- Mix only distilled, low mineral water with the anti-freeze.

#### RECOMMENDED ANTIFREEZE:

Pro Honda Coolant or an equivalent high quality ethylene glycol antifreeze containing corrosion protection inhibitors specifically recommended for use in aluminum engines

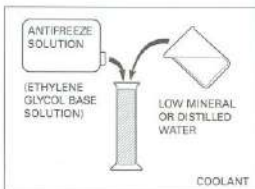
#### RECOMMENDED MIXTURE:

50-50% (Distilled water and antifreeze)

### REPLACEMENT/AIR BLEEDING

Remove the radiator cap.

When filling the system or reserve tank with coolant, on checking coolant level, place the motion cycle in a vertical position on a flat level surface.



Remove the lower cowl (page 2-4).

Remove the drain bolt on the water pump cover and drain the system coolant.

Reinstall the drain bolt with the new sealing washer. Tighten the water pump drain bolt to the specified torque.

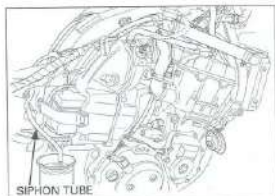
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



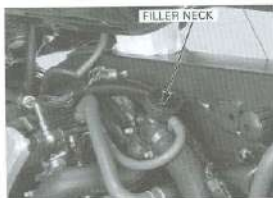
Disconnect the siphon tube from the radiator.

Drain the reserve tank coolant. Empty the coolant and rinse the inside of the reserve tank with water.

Reinstall the radiator siphon tube.



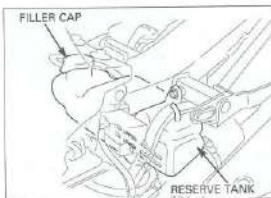
Fill the system with the recommended coolant through the filler opening up to filler neck.



Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follows:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle 3 – 4 times to bleed air from the system.
3. Stop the engine and add coolant up to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.



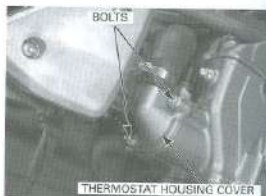
## THERMOSTAT

### THERMOSTAT REMOVAL

Open and support the front end of fuel tank (page 3-4).  
Drain the coolant (page 6-5).

Remove the bolts and thermostat housing cover.  
Remove the O-ring from the thermostat housing cover.

Remove the thermostat from the housing.



### INSPECTION

Wear insulated gloves and adequate eye protection.  
Keep flammable materials away from the electric heating element.

Visually inspect the thermostat for damage.

Heat the water with an electric heating element to operating temperature for 5 minutes.  
Suspend the thermostat in heated water to check its operation.

Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

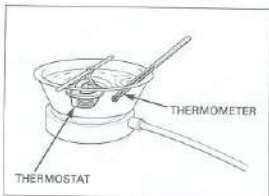
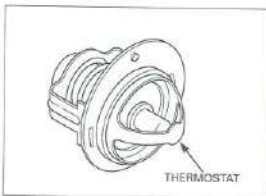
**THERMOSTAT BEGIN TO OPEN:**

80 - 84 °C (176 - 183 °F)

**VALVE LIFT:**

8 mm (0.3 in) minimum at 95 °C (203 °F)

*Do not let the thermostat or thermometer touch the pan, or you will get a false reading.*



**THERMOSTAT INSTALLATION**

Install the thermostat housing onto the cylinder head.



Install the new O-ring onto the thermostat housing cover.



Install the thermostat housing cover onto the cylinder head and tighten the housing cover bolts.

**TORQUE:** 12 N·m (1.2 kgf·m, 9 lbf·ft)

Fill the coolant and bleed air from the system (page 6-5).

**RADIATOR****REMOVAL**

Open and support the front end of fuel tank (page 3-4).

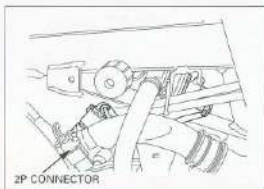
Drain the coolant (page 6-5).

Disconnect the lower radiator hose.



## COOLING SYSTEM

Disconnect the fan-motor 2P connector.



Disconnect the upper radiator hose.  
Remove the radiator lower mounting bolt/nut and washer.

Remove the radiator upper mounting bolt.

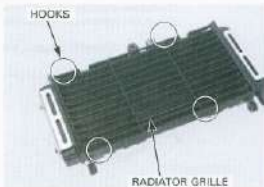
Slide the radiator to the right, then release the upper  
grommet from the frame boss.  
Remove the radiator assembly.



### DISASSEMBLY

*Be careful not  
to damage the  
radiator core.*

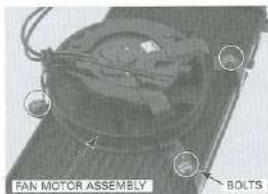
Remove the radiator grille.



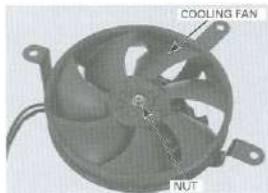
Remove the bolts and side cover.



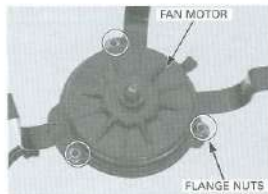
Remove the bolts and fan motor assembly.



Remove the nut and cooling fan.

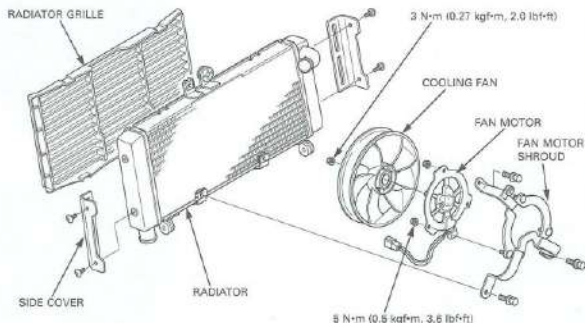


Remove the fan motor wire from the clamp.  
Remove the flange nuts and fan motor from the fan motor shroud.





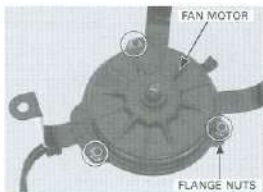
## ASSEMBLY



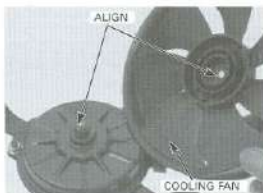
Install the fan motor onto the fan motor shroud and tighten the flange nuts to the specified torque.

**TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)**

Install the fan motor wire to the clamp.

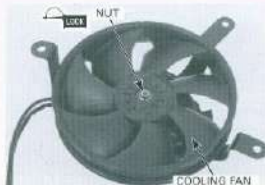


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



Apply a locking agent to the cooling fan nut threads.  
Install and tighten the nut to the specified torque.

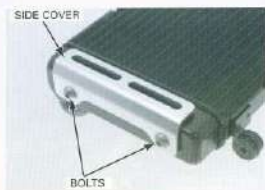
**TORQUE:** 3 N·m (0.27 kgf·m, 2.0 lbf·ft)



Install the cooling fan motor assembly onto the radiator.  
Install and tighten the bolts.

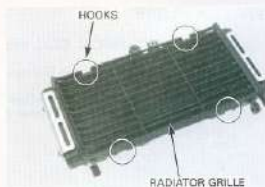


Install the side cover and tighten the bolts.



*Be careful not to damage the radiator core.*

Install the hook of the radiator grille to the radiator.



### INSTALLATION

Install the radiator assembly, aligning its grommet with the frame boss.

Install the washer and upper mounting bolt, then tighten the bolt.

Install the radiator lower mounting bolt/nut, tighten the nut securely.

Connect the upper radiator hose and tighten hose band screw securely.

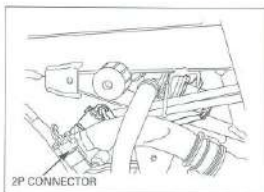


Connect the lower radiator hose and tighten hose band screw securely.



Connect the fan motor 2P connector.

Fill the system with recommended coolant (page 6-5).



## WATER PUMP

### MECHANICAL SEAL INSPECTION

Inspect the inspection hole for signs of coolant leakage.

If there is leakage, the mechanical seal is defective. Replace the water pump as an assembly.

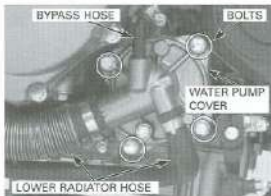


## REMOVAL

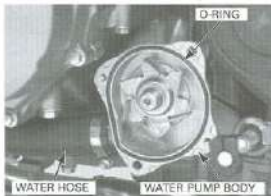
Drain the coolant (page 6-4).

Disconnect the lower radiator hose and bypass hose from the water pump cover.

Remove the bolts and water pump cover.



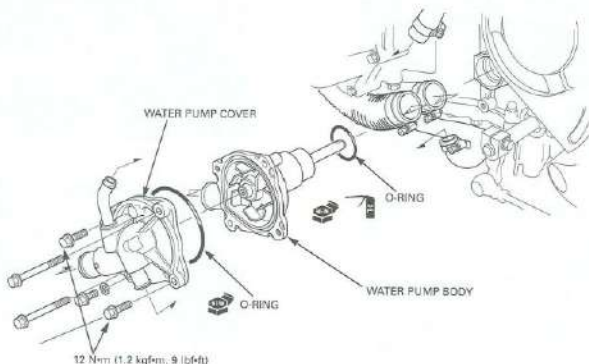
Remove the O-ring from the water pump body. Disconnect the water pump-to-water joint hose and oil cooler water hose from the water pump body.



Remove the water pump body from the crankcase.

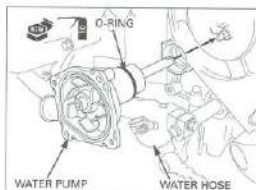


## INSTALLATION



Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

Install the water pump into the crankcase while aligning the water pump shaft groove with the oil pump shaft and by turning the water pump impeller.



Install a new O-ring into the groove in the water pump body.  
Connect the water hose.



Connect the water pump-to-water joint hose. Install the water pump cover, two SH bolts and two flange bolts.

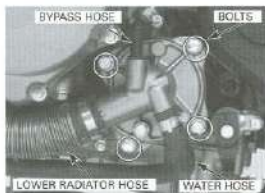
Tighten the flange bolts to the specified torque.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

Tighten the two SH bolts.

Connect the lower radiator hose and bypass hose, then tighten the clamp screws.

Fill the system with recommended coolant (page 6-5). Install the lower cowl (page 2-5).



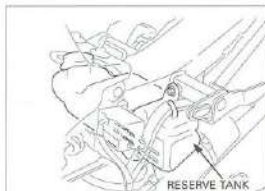
## RADIATOR RESERVE TANK

### REMOVAL

Remove the rear shock absorber (page 14-10).

Disconnect the siphon tube and drain coolant from the reserve tank.

Remove the radiator reserve tank.  
Drain the coolant.

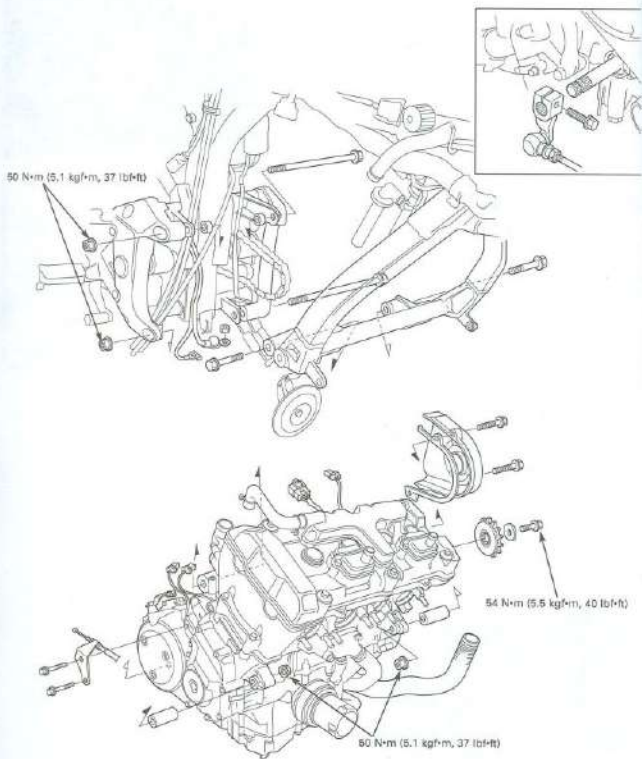


### INSTALLATION

Installation is in the reverse order of removal.

Install the flange collar and washer as shown.

Install the rear shock absorber (page 14-13).



# 7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-1	ENGINE INSTALLATION	7-6
DRIVE SPROCKET REMOVAL	7-3	DRIVE SPROCKET INSTALLATION	7-8
ENGINE REMOVAL	7-4		

## SERVICE INFORMATION

### GENERAL

- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.
- Do not use the oil filter as a jacking point.
- The following components require engine removal for service.
  - Crankcase, transmission (Section 11)
  - Crankshaft piston/cylinder (Section 12)
  - Shift fork, shift drum (Section 12)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the tighten torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.



## ENGINE REMOVAL/INSTALLATION

### SERVICE DATA

ITEM		SPECIFICATIONS
Engine dry weight		68 kg (149 lbs)
Engine oil capacity	After disassembly	4.4 liter (4.6 US qt, 3.9 imp qt)
Coolant capacity	Radiator and engine	3.2 liter (3.38 US qt, 2.82 imp qt)

### TORQUE VALUES

Front engine hanger bolts/nuts	50 N•m (5.1 kgf•m, 37 lbf•ft)
Rear upper engine hanger bolt/nut	50 N•m (5.1 kgf•m, 37 lbf•ft)
Rear lower engine hanger bolt/nut	50 N•m (5.1 kgf•m, 37 lbf•ft)
Drive sprocket special bolt	54 N•m (5.5 kgf•m, 40 lbf•ft)
Gear shift linkage bolt	20 N•m (2.0 kgf•m, 14 lbf•ft)

## DRIVE SPROCKET REMOVAL

Loosen the drive chain (page 3-16).

Remove the drive sprocket cover bolts and sprocket cover.



Remove the drive chain guide plate.



*Loosen the swingarm pivot cover mounting bolts if necessary.*

Remove the drive sprocket, washer and the drive sprocket with the drive chain from the countershaft.



### ENGINE REMOVAL

Drain the engine oil (page 3-11).  
Drain the coolant (page 6-4).

Remove the following:

- clutch cable (page 9-3)
- air cleaner housing (page 5-53)
- radiator (page 6-7)
- exhaust pipe/muffler (page 2-5)
- starter motor terminal nut (page 18-4)

Disconnect the upper water hose.



Disconnect the PAIR air supply hoses from the reed valve covers.

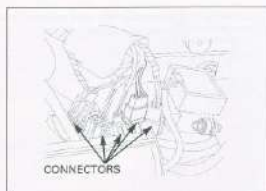
Disconnect the ignition plug caps.

Disconnect the crankcase breather tube.

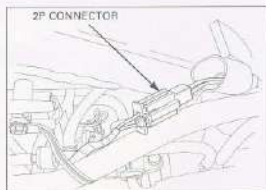


Disconnect the following:

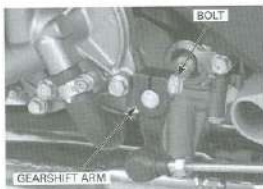
- crank pulse generator 2P connector
- regulator/rectifier 3P/4P connector
- speed sensor 3P connector
- oil pressure/neutral switch 2P connector
- side stand switch 2P connector
- ECT sensor 3P connector



- wire band
- cam pulse generator 2P connector



Remove the gearshift arm pinch bolt, then remove the gearshift arm from the gearshift spindle.



Support the engine using a jack or other adjustable support to ease engine hanger bolts removal.

**NOTE:**

Do not support the engine at the oil filter.

Remove the bolts and water by-pass cover.

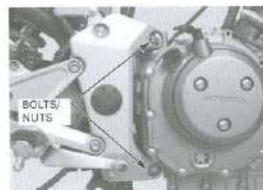
Remove the right side of the front engine hanger bolt, nut and distance collar.

Remove the left side of the front engine hanger bolt, nut and distance collar.



Remove the rear upper and lower engine hanger bolts/nuts.

Remove the engine.



Note the direction and position of the hanger bolts, nuts and distance collars.



### ENGINE INSTALLATION

- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- Route the wire and cables properly (page 1-23).

#### NOTE:

Be sure to tighten all engine mounting fasteners to the specified torque.

Carefully install the engine into the frame.  
Loosely install the rear upper and rear lower engine hanger bolts/nuts.

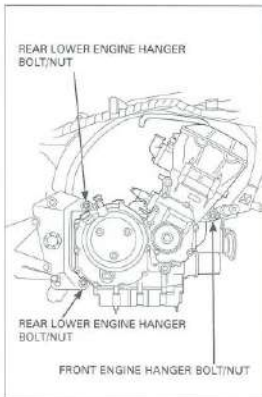
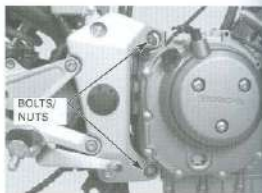
Loosely install the right and left side of the front engine hanger bolt, nut and distance collar.

Tighten all the engine hanger bolts to the specified torque.

#### TORQUE:

- R./L. front engine hanger bolts/nuts:  
50 N·m (5.1 kgf·m, 37 lbf·ft)  
Rear lower engine hanger bolts/nuts:  
50 N·m (5.1 kgf·m, 37 lbf·ft)  
Rear upper engine hanger bolts/nuts:  
50 N·m (5.1 kgf·m, 37 lbf·ft)

Tighten the right side of the front engine hanger bolt to the specified torque.



Install the new O-ring to the water by-pass cover.



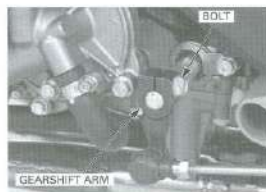
Install the water by-pass cover to the cylinder and tighten the cover bolts securely.



Install the gearshift linkage to the spindle by aligning the slit of the shift pedal and the punch mark of the spindle.

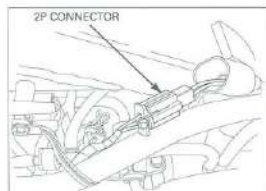
Tighten the bolt to the specified torque.

**TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)**



Install the following:

- wire band
- cam pulse generator 2P connector



## ENGINE REMOVAL/INSTALLATION

- crank pulse generator 2P connector
- regulator/rectifier 3P/4P connector
- speed sensor 3P connector
- oil pressure/neutral switch 2P connector
- side stand switch 2P connector



Install the ignition coil caps.  
Connect the PAIR air supply hoses to the reed valve covers.

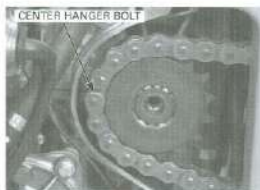
Pour recommended engine oil up to the proper level (page 3-12).

Fill the cooling system with recommended coolant and bleed the air (page 6-4).



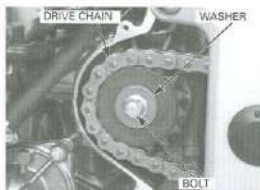
## DRIVE SPROCKET INSTALLATION

Install the drive chain on to the sprocket.  
Install the drive sprocket to the counter shaft with the punch mark facing out and align the teeth of the drive sprocket and counter shaft.



Install the the washer and tighten the special bolt to the specified torque.

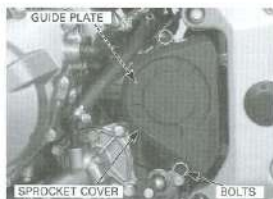
**TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)**



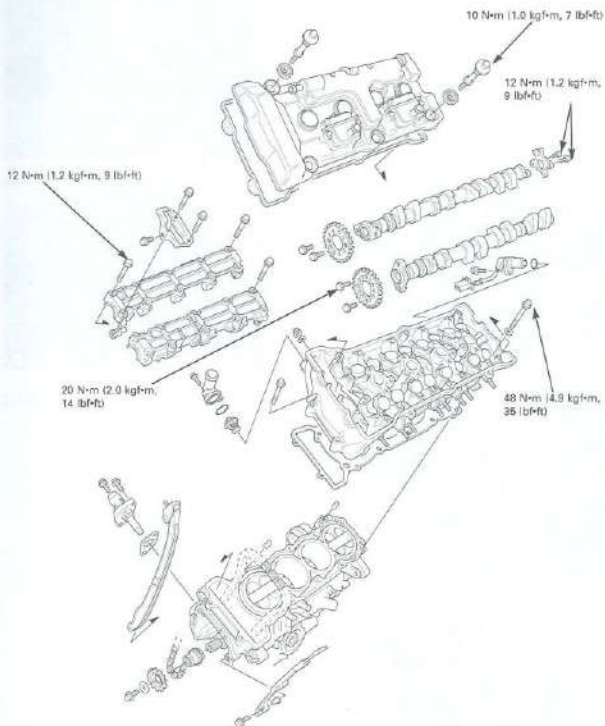
Install the drive chain guide plate.



Install the drive sprocket cover and tighten the cover bolts securely.







## 8. CYLINDER HEAD/VALVES

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-16
TROUBLESHOOTING	8-3	VALVE SEAT INSPECTION/ REFACING	8-17
CYLINDER COMPRESSION TEST	8-4	CYLINDER HEAD ASSEMBLY	8-20
CYLINDER HEAD COVER REMOVAL	8-4	CYLINDER HEAD INSTALLATION	8-21
CYLINDER HEAD COVER DISASSEMBLY/ASSEMBLY	8-5	CAMSHAFT INSTALLATION	8-23
CAMSHAFT REMOVAL	8-6	CYLINDER HEAD COVER INSTALLATION	8-28
CYLINDER HEAD REMOVAL	8-11	CAM CHAIN TENSIONER LIFTER	8-29
CYLINDER HEAD DISASSEMBLY	8-12		
CYLINDER HEAD INSPECTION	8-13		

### SERVICE INFORMATION

#### GENERAL

- This section covers service of the cylinder head, valves and camshaft.
- The camshaft services can be done with the engine installed in the frame. The cylinder head service requires engine removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling the cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

## CYLINDER HEAD/VALVES

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,275 kPa (13.0 kgf/cm <sup>2</sup> , 185 psi) at 360 min <sup>-1</sup> (rpm)	—
Valve clearance		IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.25 ± 0.03 (0.010 ± 0.001)	—
Camshaft	Cam lobe height	IN	35.040 – 36.280 (1.419 – 1.428)	36.01 (1.42)
		EX	35.800 – 36.040 (1.409 – 1.419)	35.77 (1.41)
	Runout		—	0.05 (0.002)
	Oil clearance		0.020 – 0.062 (0.008 – 0.0025)	0.10 (0.004)
Valve lifter	Valve lifter O.D.		25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.		26.010 – 26.026 (1.0240 – 1.0248)	26.04 (1.026)
Valve, valve guide	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1766)	4.465 (0.1758)
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.455 (0.1754)
	Valve guide I.D.	IN/EX	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	14.5 – 14.7 (0.57 – 0.58)	—
		EX	14.8 – 15.0 (0.58 – 0.59)	—
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length		IN	40.9 (1.61)	40.08 (1.578)
		EX	40.9 (1.61)	40.08 (1.578)
Cylinder head warpage			—	0.10 (0.004)

### TORQUE VALUES

Cylinder head mounting bolt/washer	48 N·m (4.9 kgf·m, 35 lbf·ft)	Apply molybdenum disulfide oil to the threads and seating surface Apply oil to the threads
Camshaft holder flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Breather plate flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
PAIR reed valve cover SH bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Cam sprocket flange bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	CT bolt
Cam chain lifter mounting socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply a locking agent to the threads
Cam chain tensioner pivot socket bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply a locking agent to the threads
Cylinder head stud bolt (exhaust pipe stud bolt)	See page 1-14	

## TOOLS

Compression gauge attachment	07RMJ-MY50100	Equivalent commercially available
Valve spring compressor	07757-0010000	
Valve spring compressor attachment	07959-KM30101	
Topset hole protector	07HMG-MR70002	
Valve guide driver	07743-0020000	
Valve guide reamer, 4.508 mm	07HMH-ML00101	
Valve seat cutters		- these are commercially available
Seat cutter, 27.5 mm (45° IN/EX)	07780-0010200	
Flat cutter, 27 mm (32° EX)	07780-0013300	
Flat cutter, 30 mm (32° IN)	07780-0012200	
Interior cutter, 24 mm (60° IN/EX)	07780-0010600	
Cutter holder, 4.5 mm	07781-0010600	

## TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring (Section 12).

### Compression too low, hard starting or poor performance at low speed

- Valves:
  - Incorrect valve adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head:
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
- Worn cylinder, piston or piston rings (section 12)
  - Sticking valve or broken valve spring
  - Damaged or worn camshaft
  - Loose or worn cam chain
  - Worn or damaged cam chain
  - Worn or damaged cam chain tensioner
  - Worn cam sprocket teeth

### Rough idle

- Low cylinder compression

### Compression too high, overheating or knocking

- Excessive carbon build-up on piston crown or on combustion chamber

### Excessive smoke

- Cylinder head:
  - Worn valve stem or valve guide
  - Damaged stem seal
- Worn cylinder, piston or piston rings (section 12)

### Excessive noise

- Cylinder head:
  - Incorrect valve adjustment

### CYLINDER COMPRESSION TEST

Warm up the engine to normal operating temperature.  
Stop the engine and remove all direct ignition coil/spark plug caps and spark plugs (page 3-6).  
Open and support the front end of fuel tank (page 3-4).

Disconnect the fuel pump/reserve sensor 3P connector.

Install a compression gauge into the spark plug hole.

#### TOOL:

Compression gauge attachment 07RMJ-MY50100  
(Equivalent commercially available)

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.  
The maximum reading is usually reached within 4 – 7 seconds.

#### Compression pressure:

1,275 kPa (13.0 kgf/cm<sup>2</sup>, 185 psi) at 350 min<sup>-1</sup> (rpm)

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head

*To avoid discharging the battery, do not operate the starter motor for more than seven seconds.*



### CYLINDER HEAD COVER REMOVAL

Remove the following:

- Ignition coil (page 5-62)
- Spark plug cap (page 3-6)

Remove the crankcase breather tube.

Disconnect the PAIR air suction tubes from the PAIR reed valve covers.



Remove the cylinder head cover bolts and rubber washers.

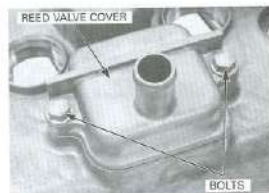


Remove the cylinder head cover.  
Remove the cylinder head cover packing.



## CYLINDER HEAD COVER DISASSEMBLY/ASSEMBLY

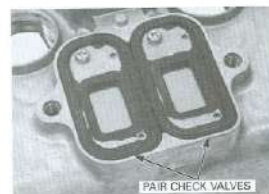
Remove the bolts and PAIR check valve cover.



Check the PAIR check valve for wear or damage,  
replace if necessary.

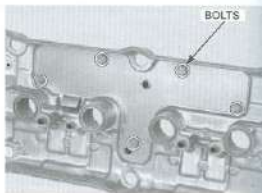
Installation is in the reverse order of removal.

**TORQUE:** 12 N·m (1.2 kgf·m, 9 lbf·ft)



## CYLINDER HEAD/VALVES

Remove bolts and breather separate and gasket.



Install the new gasket to the cover.

Install the breather plate.

Apply the locking agent to the bolt threads and tighten it to the specified torque.

**TORQUE: 12 N-m (1.2 kgf-m, 9 lbf-ft)**



## CAMSHAFT REMOVAL

Remove the cylinder head cover (page 8-4).

Avoid damaging the cam pulse generator while removing the camshafts. Remove the bolt and cam pulse generator from the cylinder head.



Remove the timing hole cap and O-ring.



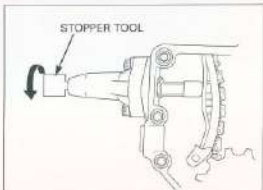
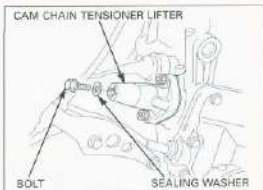
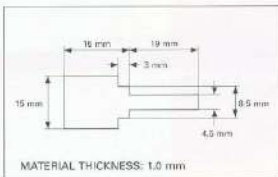
Turn the crankshaft clockwise, align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover. Make sure the No. 1 piston is at TDC (Top Dead Center) on the compression stroke.



Remove the cam chain tensioner lifter sealing bolt and sealing washer.

Turn the tensioner lifter shaft fully in (clockwise) and secure it using the following tool.

This tool can easily be made from a thin (1 mm thickness) piece of steel.



If it is not necessary to remove the cam sprocket from the crankshaft except when replacing the crankshaft and/or cam sprocket.

If you plan to replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts as follows:

- Remove the cam sprocket bolts from intake and exhaust camshafts.

Be careful not to drop the cam sprocket bolts into the crankcase.





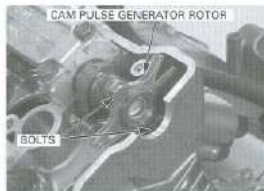
- Turn the crankshaft one full turn (360°), remove the other cam sprocket bolts from the camshafts.



- Remove the bolt.



- Remove the bolts and cam pulse generator rotor.



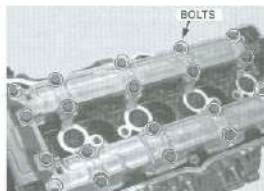
*Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.*

Loosen and remove the camshaft holder bolts, then remove the cam sprocket, cam chain guide B, camshaft holder and camshaft.

### NOTICE

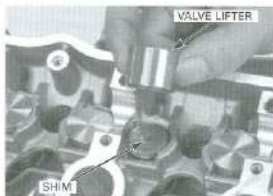
*From outside to inside, loosen the bolts in a crisscross pattern in several steps or the camshaft holder might break.*

Do not forcibly remove the dowel pins from the camshaft holder.



Remove the valve lifters and shims.

- Be careful not to damage the valve lifter bore.
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed with tweezers or a magnet.



## INSPECTION

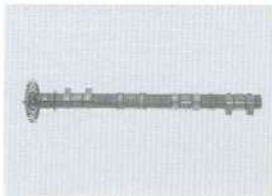
### CAMSHAFT

Check the cam and journal surfaces of the camshaft for scoring, scratches or evidence of insufficient lubrication.

Check the oil holes in the camshaft for clogging.

Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial gauge.

**SERVICE LIMIT:** 0.05 mm (0.002 in)

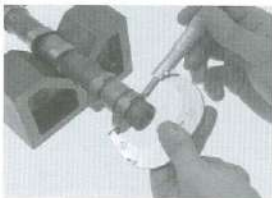


Using a micrometer, measure each cam lobe height.

### SERVICE LIMITS:

IN: 38.01 mm (1.42 in)

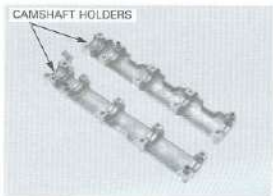
EX: 35.77 mm (1.41 in)



### CAMSHAFT HOLDER

Inspect the bearing surface of camshaft holder for scoring, scratches, or evidence of insufficient lubrication.

Inspect the oil orifices of the holders for clogging.



## CYLINDER HEAD/VALVES

### CAM CHAIN GUIDE B

Inspect the cam chain slipper surface of the cam chain guide for wear or damage.

CAM CHAIN GUIDE B



### CAMSHAFT OIL CLEARANCE

Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.

Lay a strip of plastigauge lengthwise on top of each camshaft journal.

PLASTIGAUGE



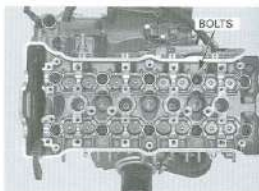
*Do not rotate the camshaft when using plastigauge.*

Install the camshaft holder onto the camshafts.

Apply engine oil to the threads and seating surfaces of the camshaft holder bolts.

Install the twenty holder bolts with the eight sealing washers.

BOLTS



The camshaft holder have the number "1 thru, 20". Temporarily tighten the four bolts of the center area gradually in the sequence 6 - 5 - 8 - 7 until the dowel pins on the camshaft holder inserts into the pin holes in the cylinder head (the clearance between the holder and head is 1 - 5 mm).

Next, tighten all the holder bolts in the numerical order cast on the camshaft holder (1 thru, 20) in several steps, then tighten them to the specified torque.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

Remove the camshaft holders and measure the width of each plastigauge.

The widest thickness determines the oil clearance.

**SERVICE LIMIT: 0.10 mm (0.004 in)**

When the service limits are exceeded, replace the camshaft and recheck the oil clearance.

Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.



## CYLINDER HEAD REMOVAL

Drain the coolant (page 6-4).

Remove the camshaft (page 8-6).

Remove the cylinder drain bolt and sealing washer.  
Drain coolant from cylinder head and cylinder block.

Check that the sealing washer is in good condition,  
replace if necessary.

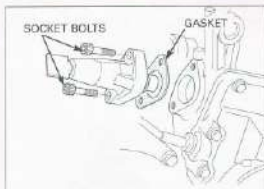
Reinstall the sealing washer and drain bolt.

Remove the socket bolts, sealing washers and cam  
chain tensioner lifter and gasket.

Remove the cap nut, sealing washer and cam chain  
tensioner.

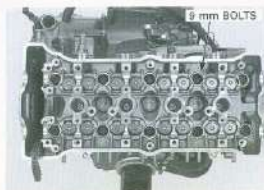
Disconnect the water hose.

Remove the thermostat housing cover and  
thermostat.

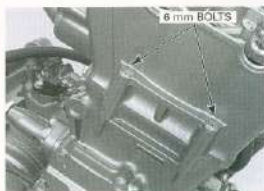


*Loosen the 9 mm  
bolts in a  
crosswise pattern  
in 2-3 steps.*

Remove the ten 9 mm bolts/washers.



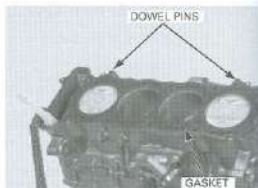
Remove the two 6 mm flange bolts.



## CYLINDER HEAD/VALVES

Remove the cylinder head.

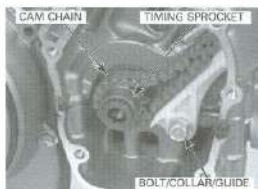
Remove the gasket and dowel pins.



Remove the right crankcase cover and ignition pulse generator rotor (page 17-71).

Remove the socket bolt, cam chain guide and collar.

Remove the cam chain and timing sprocket from the crankshaft.



## CYLINDER HEAD DISASSEMBLY

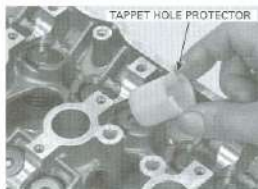
Remove the spark plugs from the cylinder head.

Install the tappet hole protector into the valve lifter bore.

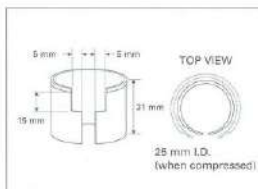
### TOOL:

Tappet hole protector

07HMG-MR70002



An equivalent tool can easily be made from a plastic 35 mm film container as shown.



Remove the valve spring cotters using the special tools as shown.

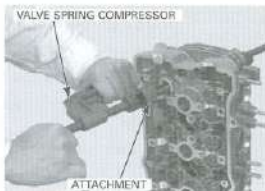
**TOOLS:**

Valve spring compressor 07757-0010000

Valve spring compressor attachment 07959-KM30101

**NOTICE**

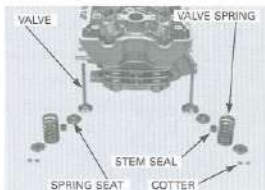
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.



Mark all parts during disassembly so they can be placed back in their original locations.

Remove the following:

- Spring retainer
- Valve spring
- Valve
- Stem seal
- Valve spring seat

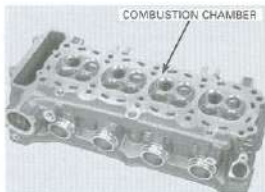


## CYLINDER HEAD INSPECTION

### CYLINDER HEAD

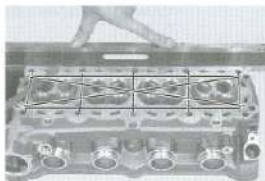
Avoid damaging the gasket surface.

Remove carbon deposits from the combustion chamber, being careful not to damage the gasket surface. Check the spark plug hole and valve areas for cracks.



Check the cylinder head for warpage with a straight edge and feeler gauge.

**SERVICE LIMIT: 0.10 mm (0.004 in)**



### VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.  
Measure each valve lifter bore I.D.

**SERVICE LIMIT: 26.04 mm (1.025 in)**



### VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.  
Measure each valve lifter O.D.

**SERVICE LIMIT: 25.97 mm (1.022 in)**

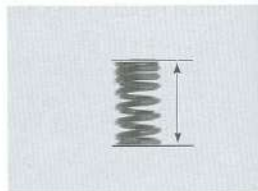


### VALVE SPRING

Measure the valve spring free length.

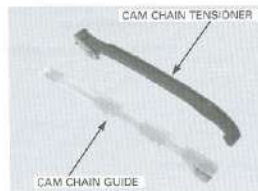
**SERVICE LIMITS: 40.8 mm (1.578 in)**

Replace the springs if they are shorter than the service limits.



### CAM CHAIN TENSIONER/CAM CHAIN GUIDE

Inspect the cam chain tensioner and cam chain guide for excessive wear or damage, replace if necessary.



## VALVE/VALVE GUIDE

Check that the valve moves smoothly in the guide. Inspect each valve for bending, burning or abnormal stem wear.

Check valve movement in the guide, measure and record each valve stem O.D.

### SERVICE LIMITS:

IN: 4.465 mm (0.1758 in)

EX: 4.455 mm (0.1754 in)

Ream the guides to remove any carbon deposits before checking clearances.

Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

### TOOL:

Valve guide reamer, 4.508 mm 07HMH-ML00101



VALVE GUIDE REAMER



Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 4.540 mm (0.1787 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

### SERVICE LIMITS:

IN: 0.075 mm (0.0030 in)

EX: 0.085 mm (0.0033 in)



*Replace the valve seats whenever the valve guides are replaced (page 8-17).*

If the stem-to-guide clearance is out of standard, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit. If the stem-to-guide clearance is out of standard with the new guides, replace the valves and guides.



## VALVE GUIDE REPLACEMENT

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.  
Heat the cylinder head to 100 – 150°C (212 – 300°F) with a hot plate or oven.

**NOTICE**

*Do not use a torch to heat the cylinder head; it may cause warping.*

Support the cylinder head and drive out the valve guides from the combustion chamber side of the cylinder head.

**TOOL:**

Valve guide driver

07HMD-ML00101

Drive in the guide to the specified depth from the top of the cylinder head.

**TOOL:**

Valve guide driver

07743-0020000

**SPECIFIED DEPTH:**

IN: 14.5 – 14.7 mm (0.57 – 0.58 in)

EX: 14.8 – 15.0 mm (0.58 – 0.59 in)

*Use cutting oil on the reamer during the operation.*

Let the cylinder head cool to room temperature.

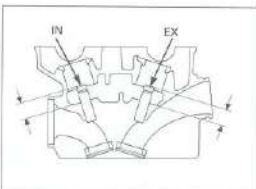
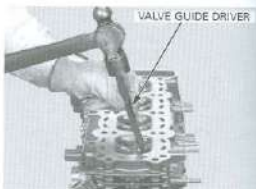
Ream the new valve guide after installation.  
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

**TOOL:**

Valve guide reamer, 4.508 mm 07HMH-ML00101

Clean the cylinder head thoroughly to remove any metal particles.

Reface the valve seat (see following steps).



## VALVE SEAT INSPECTION/REFACING

*The valves cannot be ground. If a valve face is burned or badly worn or if it contacts the seat improperly, replace the valve.*

Clean the intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian Blue to the valve seats.

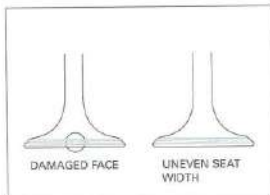
Tap the valves and seats using a rubber hose or other hand-lapping tool.

Remove the valve and inspect the valve seat face.

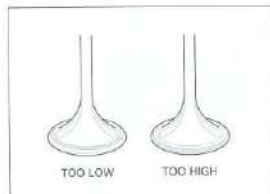


Inspect the valve seat face for:

- Uneven seat width:
  - Replace the valve and reface the valve seat.
- Damaged face:
  - Replace the valve and reface the valve seat.



- Contact area (too high or too low)
  - Reface the valve seat.

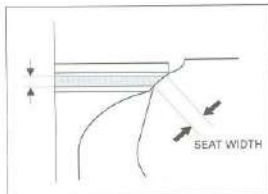


The valve seat contact should be within the specified width and even all around the circumference.

**STANDARD:** 0.90 – 1.10 mm (0.035 – 0.043 in)

**SERVICE LIMIT:** 1.5 mm (0.06 in)

If the seat width is not within specification, reface the valve seat (page 8-18).



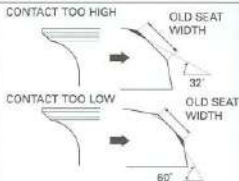
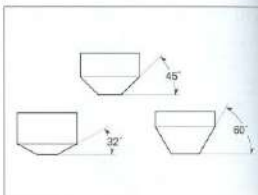
## VALVE SEAT REFACING

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.

*Follow the refacing manufacturer's operating instructions.*

If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



Use a 45-degree cutter to remove any roughness or irregularities from the seat.

## TOOLS:

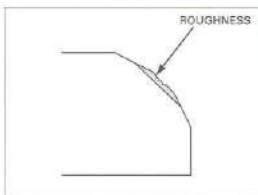
Seat cutter, 27.5 mm

(45° IN/EX)

Cutter holder, 4.5 mm

07780-0010200

07781-0010600 or  
equivalent commercially available



Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.

## TOOLS:

Flat cutter, 27 mm (32° EX)

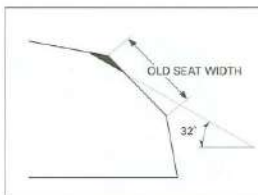
Flat cutter, 30 mm (32° IN)

Cutter holder, 4.5 mm

07780-0013300

07780-0012200

07781-0010600 or  
equivalent commercially available



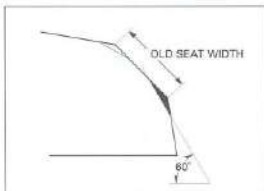
Use a 60-degree cutter to remove the bottom 1/4 of the old seat.

#### TOOLS:

Interior cutter, 24 mm  
(80° IN/EX)

Cutter holder, 4.5 mm

07780-0010600  
07781-0010600 or  
equivalent commercially available



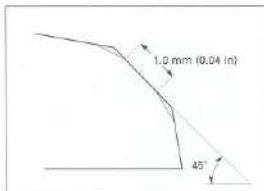
Using a 45° seat cutter, cut the seat to the proper width.  
Make sure that all pitting and irregularities are removed.  
Refinish if necessary.

After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

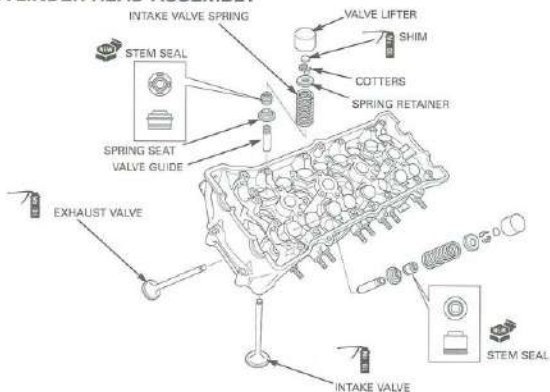
#### NOTICE

- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Do not allow lapping compound to enter the guides.

After lapping, wash all residual compound off the cylinder head and valve.



## CYLINDER HEAD ASSEMBLY



Blow through all oil passages in the cylinder head with compressed air.

Install the tappet hole protector into the valve lifter bore.

**TOOL:**

Tappet hole protector

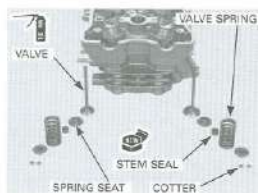
07HMG-MR70002



*Grease the  
coppers to ease  
installation.*

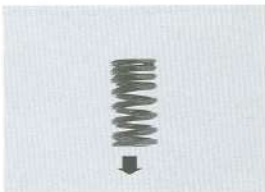
Install the valve spring seats.  
Install the new stem seals.

Lubricate the valve stems with molybdenum oil solution.  
Insert the valve into the valve guide while turning it slowly to avoid damage to the stem seal.



Support the cylinder head above the work bench surface to prevent possible valve damage.

Install the valve spring with the tightly wound coils facing the combustion chamber.



Install the valve spring retainer.

Install the valve cotters using the special tool as shown.

**NOTE:**

To prevent loss of tension, do not compress the valve spring more than necessary.

**TOOLS:**

Valve spring compressor 07757-0010000  
Valve spring compressor attachment 07959-KM30101



Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

Install and tighten the spark plugs.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



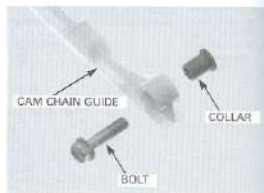
## CYLINDER HEAD INSTALLATION

Install the timing sprocket by aligning the wide teeth between the crankshaft and sprocket.

Install the cam chain.



Install the cam chain guide and bolt/washer.



Install the washer, cam chain tensioner and socket bolt.

Tighten the cam chain guide bolt to the specified torque.

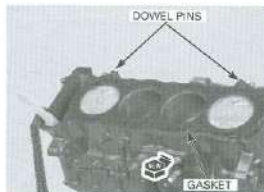
**TORQUE:**

Cam chain guide bolt:  
12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the ignition pulse generator rotor and right crankcase cover (page 17-7).



Install the dowel pins and a new cylinder head gasket as shown.



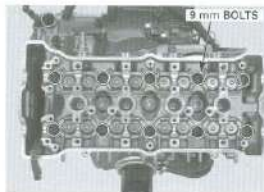
Install the cylinder head onto the cylinder block.

Apply molybdenum disulfide oil solution to the threads and seating surface of the 9 mm bolts/washers and install them.

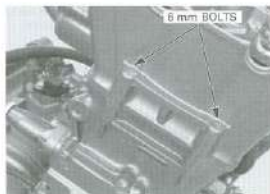
Install the two 6 mm flange bolts.

Tighten the 9 mm bolts in a crisscross pattern in 2 - 3 steps to the specified torque.

**TORQUE: 48 N·m (4.9 kgf·m, 35 lbf·ft)**



Tighten the 6 mm flange bolts.



Install the cam chain tensioner onto the cylinder head.

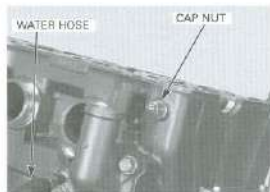
Tighten the nut to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Connect the water hose.

Remove the following:

- Thermostat housing (page 6-7)
- Camshaft (see below)



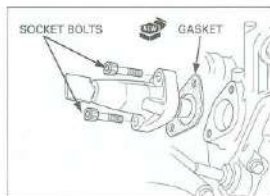
## CAMSHAFT INSTALLATION

Install the new gasket and cam chain tensioner onto the cylinder.

Install the new sealing washers and tighten the socket bolts to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the camshaft (see below).



*Install the shims and valve lifters in their original locations.*

Apply molybdenum oil solution to the outer surface of the each valve lifter.

Install the shims and valve lifters into the valve lifter bores.



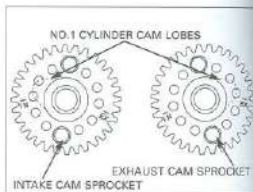


## CYLINDER HEAD/VALVES

*Insert the cam pulse generator rotor with the No.1 camshaft lobes facing up and rotor "OUT" mark facing down as shown.*

If the cam sprockets are removed, install the cam sprockets onto the camshafts.

- Install the intake cam sprocket with the timing mark (IN) facing outward and the No.1 cam lobes facing up and out as shown.
- Install the exhaust cam sprocket with the timing mark (EX) facing outward and the No.1 cam lobes facing up and out as shown.



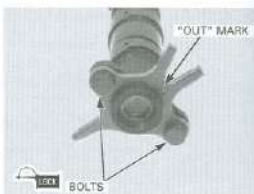
Clean and apply a locking agent to the cam sprocket bolt threads.

Install the cam sprocket bolts.



Clean and apply a locking agent to the cam pulse generator rotor threads.

Install the cam pulse generator rotor and mounting bolts.



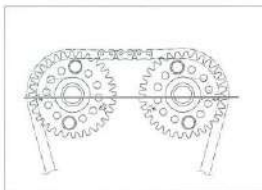
Turn the crankshaft clockwise and align the "T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



Apply molybdenum oil solution to the camshaft journals of the cylinder head and camshaft holder.

Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.

- Install each camshaft to the correct locations with the identification marks.  
 "IN": Intake camshaft  
 "EX": Exhaust camshaft
- Make sure that the timing marks on the cam sprockets are facing outward and flush with the cylinder head upper surface as shown.



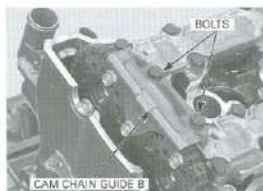
Be sure the dowel pins in the camshaft holder align properly with the holes in the cylinder head.

Apply molybdenum oil solution to the camshaft holder as shown.



Install the camshaft holder onto the camshafts.

Apply engine oil to the threads and seating surfaces of the camshaft holder bolts.  
 Install the cam shaft holder B and holder bolt (color: silver) from the front side of the cam sprockets.  
 Install the twenty bolts to the cam shaft holder.  
 Finger tighten the bolts.

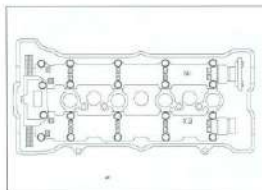


The camshaft holder has the number "1" through 20 cast into it.

Gradually tighten the #6, #5, #8, and #7 bolts (in that order) 1/4 to 1/2 turn at a time to draw the holder down evenly until the clearance between the cylinder head and the holder is 2 - 3 mm all the way around.

If the holder tilts toward the #1 cylinder during this process, readjust bolts #6, #5, #8, and #7 as necessary to keep the holder level.

When the holder is parallel with the cylinder head, resume tightening the bolts in the sequence specified above.



## CYLINDER HEAD/VALVES

Once the clearance is within 2 – 3 mm, begin tightening all the bolts in numerical order (#1, #2, #3, ...#20) 1/4 turn at a time until the holder is fully seated against the cylinder head.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Install the cam chain guide B, and tighten the bolts.



In case the cam sprockets were removed, tighten the cam sprocket bolts to the specified torque.

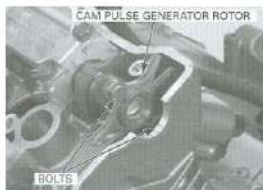
**TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)**

Turn the crankshaft clockwise one full turn (360°) and tighten the other cam sprocket bolts.

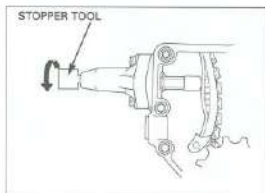


In case the cam pulse generator rotor bolts were removed, tighten the rotor bolts to the specified torque.

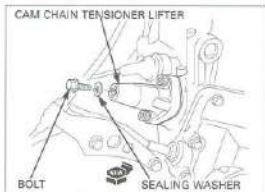
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



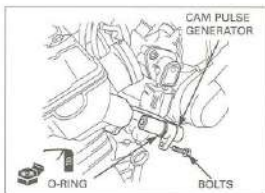
Remove the stopper tool from the cam chain tensioner lifter.



Install a new sealing washer and tighten the sealing bolt.  
Recheck the valve timing.



Apply oil to the new O-ring, and install it onto the cam pulse generator.  
Install the cam pulse generator into the cylinder head.

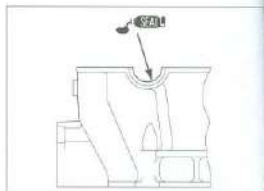


Install and tighten the mounting bolt securely.



## CYLINDER HEAD COVER INSTALLATION

Apply sealant to the cylinder head semi-circular cut-outs as shown.

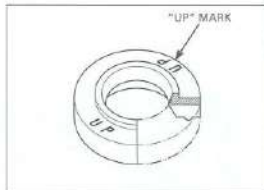


Install the cylinder head packing into the groove of the cylinder head cover.

Install the cylinder head cover onto the cylinder head.

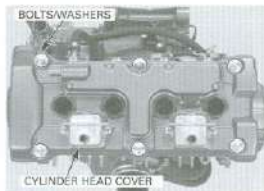


Install the washers with their "UP" mark facing up.



Install and tighten the cylinder head cover special bolts to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**



Connect the air supply hoses to the PAIR reed valve covers.

Install the following:

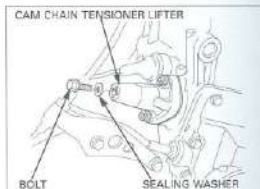
- ignition coil (#2-#3)(page 17-7)
- spark plug cap (page 3-7)



## CAM CHAIN TENSIONER LIFTER

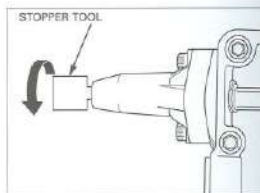
### REMOVAL

Remove the cam chain tensioner sealing bolt and sealing washer.



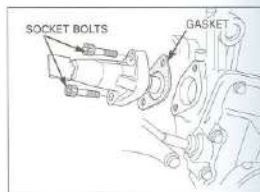
Turn the tensioner shaft fully in (clockwise) and secure it using the stopper tool to prevent damaging the cam chain.

See page 8-7 for details of the tool.



*Note the installation direction of the gasket.*

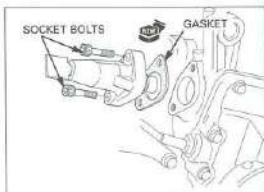
Remove the bolts and cam chain tensioner lifter. Remove the gasket.



### INSTALLATION

Install the new gasket onto the cam chain tensioner lifter.

Install the cam chain tensioner lifter into the cylinder head.

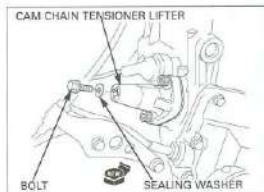


Install and tighten the mounting bolts securely.

Remove the stopper tool.

Install a new sealing washer and tighten the sealing bolt securely.

Install the removed parts in the reverse order of removal.



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## MEMO



# 9. CLUTCH/GEARSHIFT LINKAGE

<b>SERVICE INFORMATION</b>	<b>9-1</b>	<b>CLUTCH</b>	<b>9-4</b>
<b>TROUBLESHOOTING</b>	<b>9-2</b>	<b>GEARSHIFT LINKAGE</b>	<b>9-12</b>
<b>RIGHT CRANKCASE COVER REMOVAL</b>	<b>9-3</b>	<b>SHIFT FORK/SHIFT DRUM</b>	<b>9-13</b>
<b>LIFTER LEVER</b>	<b>9-4</b>	<b>RIGHT CRANKCASE COVER INSTALLATION</b>	<b>9-14</b>

## SERVICE INFORMATION

### GENERAL

- This section covers service of the clutch, gearshift linkage, shift drum and shift forks. All service can be done with the engine installed in the frame.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10 – 20 (3/8 – 13/16)	—
Clutch	Spring free length	48.8 (1.92)	47.5 (1.87)
	Disc thickness	2.92 – 3.08 (0.115 – 0.121)	2.6 (0.10)
	Plate warpage	—	0.30 (0.012)
Clutch outer guide	I.D.	24.994 – 25.004 (0.9840 – 0.9844)	25.01 (0.985)
	O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.97 (1.377)
Mainshaft O.D. at clutch outer guide		24.980 – 24.993 (0.9835 – 0.9840)	24.96 (0.983)

### TORQUE VALUES

Clutch center lock nut	128 N·m (13.1 kgf·m, 95 lbf·ft)	Apply oil to the threads Stake the nut
Clutch spring bolt/washer	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	
Shift drum center socket bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply a locking agent to the threads
Shift drum stopper arm pivot bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Gearshift spindle return spring pin	22 N·m (2.2 kgf·m, 16 lbf·ft)	

### TOOLS

Clutch center holder	07724-0050002	Equivalent commercially available
Driver	07749-0010000	
Attachment, 32 X 35 mm	07746-0010100	
Attachment, 37 X 40 mm	07746-0010200	
Pilot, 17 mm	07746-0040400	
Pilot, 35 mm	07746-0040800	

### TROUBLESHOOTING

#### Clutch lever too hard to pull in

- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

#### Clutch slips when accelerating

- Worn clutch disc
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additive

#### Clutch will not disengage or motorcycle creeps with clutch disengaged

- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

#### Hard to shift

- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

#### Transmission jumps out of gear

- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

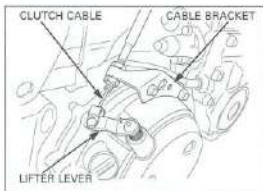
#### Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

## RIGHT CRANKCASE COVER REMOVAL

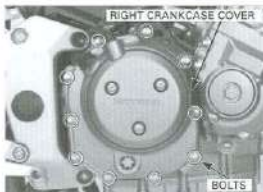
Drain the engine oil (page 3-18).

Remove the bolts and clutch cable guide, then disconnect the clutch cable end from the clutch lifter lever.



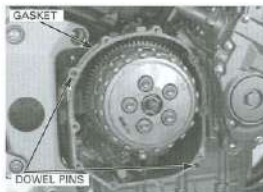
Remove the right crankcase cover 5H bolts and clutch cable guide.

*The lifter arm spindle is engaged with the clutch lifter piece inside the right crankcase cover.*



Remove the right crankcase cover while turning the clutch lifter arm counterclockwise to disengage the lifter arm spindle from the lifter piece. Remove the two dowel pins and gasket.

Clean the right crankcase cover mating surfaces.

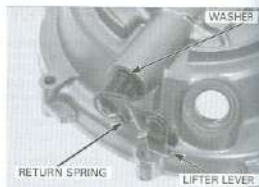


### CLUTCH LIFTER LEVER

Remove the clutch lifter lever, return spring and washer from the right crankcase cover.

Check the lifter lever spindle for wear or damage.  
Check the return spring for fatigue or damage.

Check the lifter lever oil seal and needle bearings for wear or damage.  
Install the clutch lifter lever with the washer and spring in the reverse order of removal.



## CLUTCH

### REMOVAL

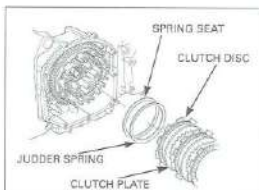
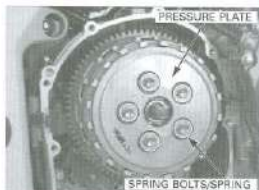
Remove the right crankcase cover (page 9-3).

Remove the clutch spring bolts, springs and pressure plate.

Remove the clutch lifter piece from the lifter bearing.

Remove the following:

- Clutch discs
- Clutch plates
- Spring seat
- Judder spring



Unstake the clutch center lock nut.

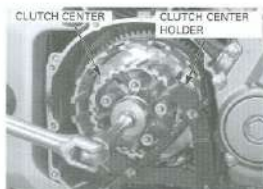


Hold the clutch center with the clutch center holder, then remove the lock nut.

**TOOL:**

Clutch center holder

07724-0050002  
(Equivalent commercially available)



Discard the lock nut.

Remove the lock washer, thrust washer and clutch center.



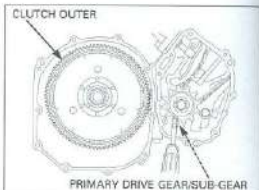
Remove the washer.



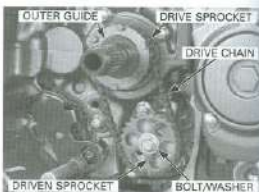
## CLUTCH/GEARSHIFT LINKAGE

Be careful not to bend the ignition pulse generator rotor angle.

Align the gear teeth of the solenoid gears (primary drive gear and sub-gear) by inserting a screwdriver into the gear hole indicated by the punch mark on the sub-gear through the hole in the crankcase, and remove the clutch outer.



Remove the oil pump driven sprocket bolt/washer. Remove the oil pump drive/driven sprocket and drive chain as an assembly.



## INSPECTION

### Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger.

The bearing should turn smoothly and quietly. Also check that the outer race of the bearing fits tightly in the pressure plate.

Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the pressure plate.

Drive the bearing out of the pressure plate.

Drive a new bearing into the pressure plate with its mark side facing out.

### TOOLS:

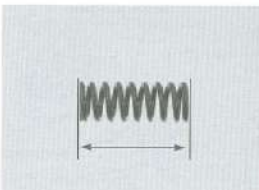
Driver	07749-0010000
Attachment, 32 X 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400

### Clutch spring

Measure the clutch spring free length.

**SERVICE LIMIT: 47.5 mm (1.87 in)**

Replace the clutch spring as a set.



**Clutch center**

Check the grooves of the clutch center for damage or wear caused by the clutch plates. Replace if necessary.

CLUTCH CENTER

**Clutch lifter piece**

Check the clutch lifter piece for damage or abnormal wear.

LIFTER PIECE

**Clutch disc**

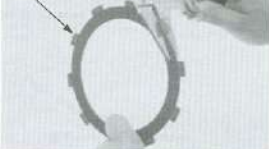
Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of each disc.

**SERVICE LIMIT: 2.6 mm (0.10 in)**

*Replace the clutch discs and plates as a set.*

CLUTCH DISC

**Clutch plate**

Check each disc plate for warpage on a surface plate using a feeler gauge.

**SERVICE LIMIT: 0.30 mm (0.012 in)**

*Replace the clutch discs and plates as a set.*

CLUTCH PLATE



## CLUTCH/GEARSHIFT LINKAGE

### Clutch outer/clutch outer guide

Check the slots of the clutch outer for damage or wear caused by the clutch discs.  
Replace if necessary.

Measure the O.D. and I.D. of the clutch outer guide.

#### SERVICE LIMITS:

O.D.: 34.97 mm (1.377 in)

I.D.: 25.01 mm (0.985 in)

CLUTCH OUTER



### Mainshaft

Measure the mainshaft O.D. at the clutch outer guide sliding surface.

SERVICE LIMIT: 24.96 mm (0.983 in)



## CLUTCH OUTER NEEDLE BEARING REPLACEMENT

Press the needle bearing out of the clutch outer using the special tools.

#### TOOLS:

Driver

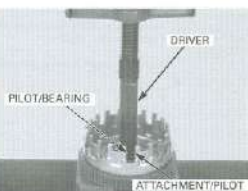
Attachment, 37 X 40 mm

Pilot, 35 mm

07749-0010000

07746-0010200

07746-0040800





Press a new needle bearing into the clutch outer so that the casing of the needle bearing is below 0.4 – 0.6 mm (0.016 – 0.023 in) from the oil pump drive sprocket side of the clutch outer surface as shown.

#### TOOLS:

Driver

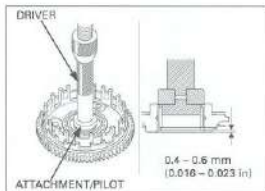
07749-0010000

Attachment, 37 X 40 mm

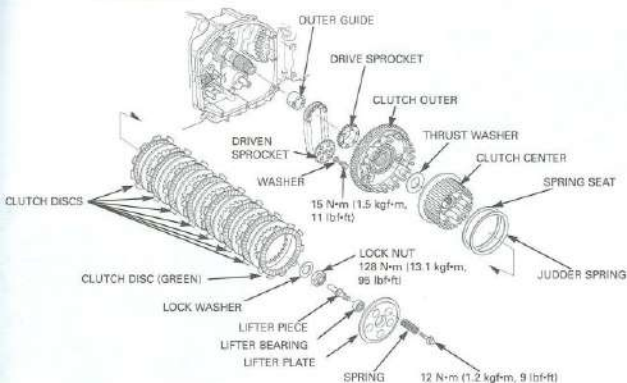
07746-0010200

Pilot, 35 mm

07746-0040800



## INSTALLATION



Install the oil pump driven sprocket with its "OUT" mark facing out.

Install the clutch outer guide, oil pump drive/driven sprocket and drive chain as an assembly.



## CLUTCH/GEARSHIFT LINKAGE

Apply a locking agent to the threads of the oil pump driven sprocket bolt.  
Tighten the driven sprocket bolt to the specified torque.

**TORQUE: 15 N·m (1.5 kgf-m, 11 lbf-ft)**

*Be careful not to bend the ignition pulse generator rotor tangs.*

Align the primary drive gear and sub-gear teeth with a screwdriver as shown.

Install the clutch outer.

Be sure the clutch outer sits securely onto the positioning tabs of the oil pump drive sprocket. Rotate the oil pump drive chain while installing the clutch outer to properly seat it.

Make sure that the primary driven gear of the clutch outer is flush with the primary drive sub-gear.  
Release the cam chain tensioner (page 8-26).

Install the washer onto the clutch outer.

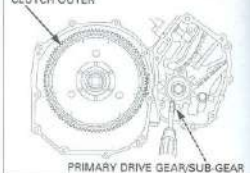
Install the clutch center.

Install the thrust washer.

Install the lock washer with its "OUTSIDE" mark facing out.



CLUTCH OUTER



Install the new lock nut.

Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

**TOOL:**

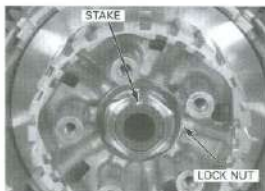
**Clutch center holder** 07724-0050002  
(Equivalent commercially available)

**TORQUE:** 128 N·m (13.1 kgf·m, 95 lbf·ft)

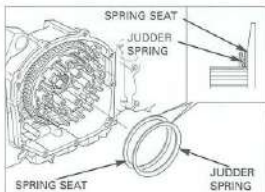


*Be careful not to damage the mainshaft threads.*

Stake lock nut into the mainshaft groove with a punch.

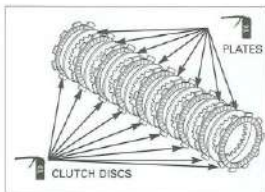


Apply engine oil and install the spring seat and judder spring.



Coat the clutch discs and plates with clean engine oil.

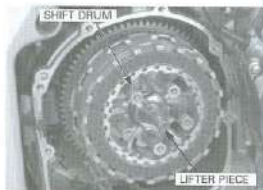
Stack the clutch discs and plates alternately.



## CLUTCH/GEARSHIFT LINKAGE

Install the outer clutch disc colored "Green" in the shallow slot on the clutch outer.

Install the clutch lifter piece.

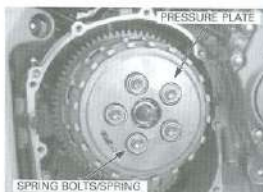


Install the pressure plate.

Install the clutch springs and spring bolts. Tighten the bolts in a crisscross pattern in 2 - 3 steps, then tighten the bolts to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Install the right crankcase cover (page 9-14).



## GEARSHIFT LINKAGE

### GEARSHIFT LINKAGE REMOVAL

Remove the following:

- Right crankcase cover (page 9-3)
- Clutch assembly (page 9-4)

Remove the bolt and gearshift pedal link.



Pull the gearshift spindle assembly and thrust washer out of the crankcase.



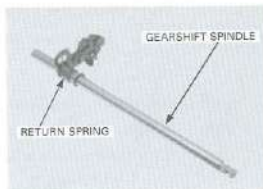
Remove the following:

- Stopper arm socket bolt
- Stopper arm
- Return spring
- Washer
- Dowel pins
- Socket bolt
- Gearshift cam



## GEARSHIFT LINKAGE INSPECTION

Check the gearshift spindle for wear, damage or bending.  
Check the return spring for fatigue or damage.



## SHIFT FORK/SHIFT DRUM

*Align the dowel pin on the shift drum center with the wide groove on the gearshift cam.*

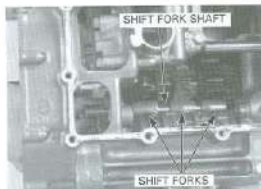
### REMOVAL

Separate the crankcase halves (page 11-3).

Remove the shift drum bearing set plate bolt/washer.



Remove the shift fork shaft and shift forks.



Remove the shift drum.



### SHIFT DRUM/SHIFT FORK INSPECTION

Check the shift fork guide pin for abnormal wear or damage.

Measure the shift fork I.D.

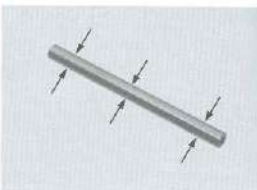
**SERVICE LIMIT: 12.03 mm (0.474 in)**

Measure the shift fork claw thickness.

**SERVICE LIMIT: 5.9 mm (0.23 in)**

Measure the shift fork shaft O.D.

**SERVICE LIMIT: 11.95 mm (0.470 in)**



Inspect the shift drum guide grooves for abnormal wear or damage.

Turn the outer race of the shift drum bearing with your finger.

The bearing should turn smoothly and freely without excessive play.

If necessary replace the bearing.



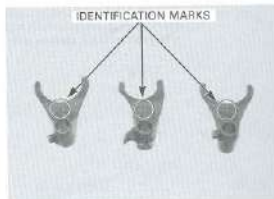
## INSTALLATION

Install the shift drum into the lower crankcase.

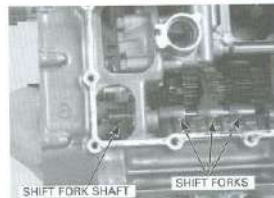


The shift forks have location marks:

- "R" for right
- "L" for left
- "C" for center



Install the shift forks into the shift drum guide groove with the identification marks facing toward the right side of the engine and insert the fork shaft.



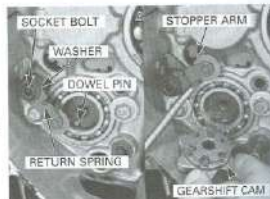
## GEARSHIFT LINKAGE INSTALLATION

Install the following:

- Washer
- Return spring
- Stopper arm
- Socket bolt

Tighten the stopper arm socket bolt to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



## CLUTCH/GEARSHIFT LINKAGE

Install the dowel pin onto the shift drum.  
Install the gearshift cam while holding the stopper arm using a screwdriver as shown.

Apply a locking agent to the gearshift cam socket bolt threads.

Install and tighten the socket bolt to the specified torque.

**TORQUE: 23 N·m (2.3 kgf-m, 17 lbf-ft)**

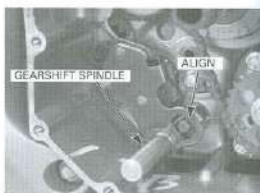
Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin.

Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin.

Install the gearshift pedal link aligning its slit with the punch mark on the gearshift spindle.  
Install and tighten the pinch bolt to the specified torque.

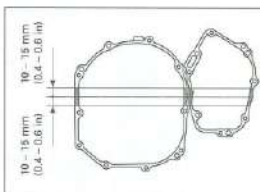
**TORQUE: 20 N·m (2.0 kgf-m, 14 lbf-ft)**

Install the clutch assembly (page 9-9).



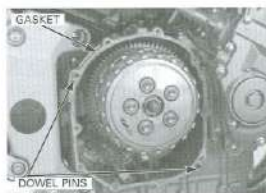
## RIGHT CRANKCASE COVER INSTALLATION

Apply a sealant to the mating surfaces of the crankcase as shown.

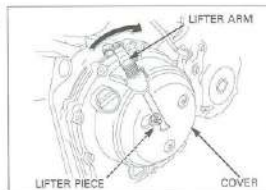




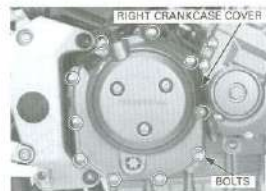
Install the two dowel pins.



Install the right crankcase cover while turning the lifter arm clockwise to engage the lifter arm groove with the lifter piece flange.



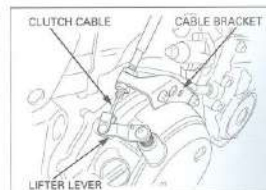
Set the clutch cable guide onto the right crankcase cover.

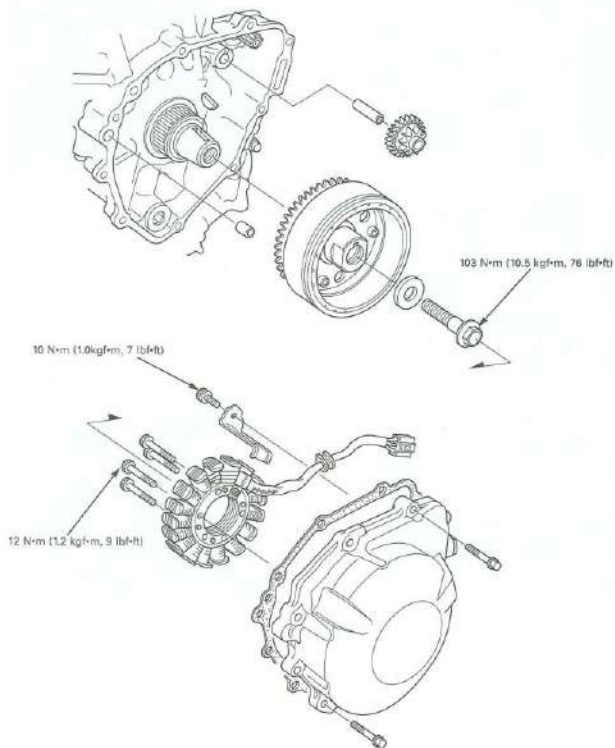


Install and tighten the right crankcase cover SH bolts in 2 or 3 steps.  
Connect the clutch cable end to the clutch lifter lever.

Pour the recommended engine oil (page 3-14).

Install the removed parts in the reverse order of removal.





# 10. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	10-1	FLYWHEEL REMOVAL	10-3
TROUBLESHOOTING	10-1	STARTER CLUTCH	10-5
ALTERNATOR COVER REMOVAL	10-2	FLYWHEEL INSTALLATION	10-7
STATOR	10-2	ALTERNATOR COVER INSTALLATION	10-8

## SERVICE INFORMATION

### GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch. All service can be done with the engine installed in the frame.
- Refer to section 16 for alternator stator inspection.
- Refer to section 16 for starter motor servicing.

### SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Stator driven gear bore O.D.	51.689 - 51.716 (2.0354 - 2.0341)	51.694 (2.0340)

10

### TORQUE VALUES

Alternator stator socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Starter clutch outer socket bolt	18 N·m (1.8 kgf·m, 12 lbf·ft)	Apply a locking agent to the threads
Flywheel flange bolt	103 N·m (10.3 kgf·m, 76 lbf·ft)	Apply oil to the threads
Stator wire clamp flange bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	CT bolt

### TOOLS

Flywheel holder	07725-80A0000	Equivalent commercially available
Rotor puller	07733-80Z0001	or 07933-3950050

## TROUBLESHOOTING

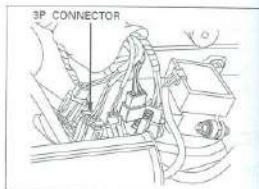
### Engine does not turn

- Faulty starter clutch
- Damaged reduction gear/shaft

### ALTERNATOR COVER REMOVAL

Remove the left side cover (page 2-2).

Disconnect the alternator 3P connector.



*The alternator cover (stator) is magnetically attracted to the flywheel, be careful during removal.*

Remove the alternator cover SH bolts and alternator cover.

The engine oil will run out when the alternator cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.



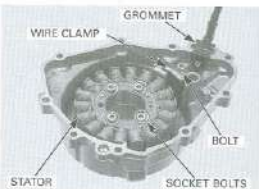
Remove the gasket and dowel pin.



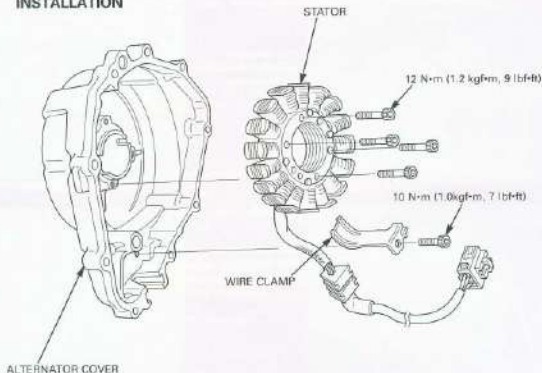
### STATOR

#### REMOVAL

Remove the alternator wire grommet from the alternator cover.  
Remove the socket bolt and stator wire clamp.  
Remove the socket bolts and stator.



## INSTALLATION



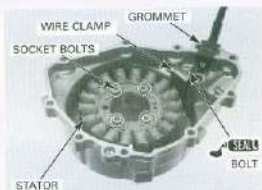
Install the stator into the alternator cover.

Apply sealant to the wire grommet, then install the wire grommet into the alternator groove securely. Install and tighten the stator mounting socket bolts to the specified torque.

**TORQUE: 12 N·m (1.2 kgf-m, 9 lbf-ft)**

Install the wire clamp and tighten the bolt to the specified torque.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**



## FLYWHEEL REMOVAL

Remove the alternator cover (page 10-2).

Remove the starter reduction gear shaft and reduction gear.



## ALTERNATOR/STARTER CLUTCH

Hold the flywheel using the flywheel holder, then remove the flywheel bolt.

### TOOL:

Flywheel holder

07725-004000  
(Equivalent commercially available)

Remove the washer.



Remove the flywheel using the special tool.

### TOOL:

Rotor puller

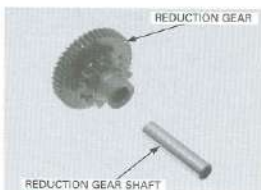
07733-0020001 or  
07933-3950000



Remove the woodruff key.



Check the starter reduction gear and shaft for wear or damage.



## STARTER CLUTCH

### INSPECTION

Check the operation of the one-way clutch by turning the driven gear.

You should be able to turn the driven gear counter-clockwise smoothly, but the gear should not turn clockwise.

### DISASSEMBLY

Remove the starter driven gear by turning it counter-clockwise.

Hold the flywheel with a flywheel holder, and remove the starter clutch mounting torx bolts.

#### TOOL:

Flywheel holder

07725-0040000

(Equivalent commercially available)

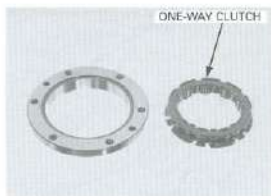
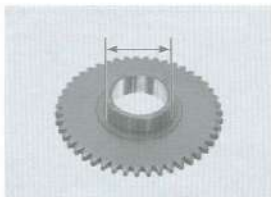
Remove the starter one-way clutch assembly.

Check the starter driven gear for abnormal wear or damage.

Measure the starter driven gear boss O.D.

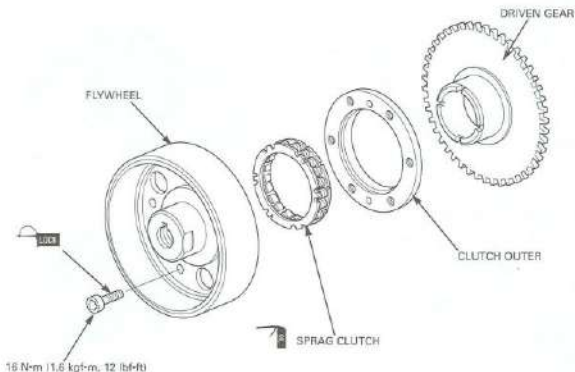
**SERVICE LIMIT:** 51.684 mm (2.0348 in)

Check the one-way clutch for wear or damage and replace if necessary.

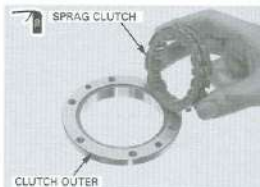


## ALTERNATOR/STARTER CLUTCH

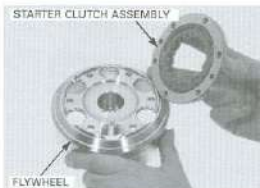
### ASSEMBLY



Apply engine oil to the sprag clutch contacting surfaces.  
Install the sprag clutch into the starter clutch outer with the flange side facing out.



Install the starter one-way clutch assembly onto the flywheel.





Apply a locking agent to the starter clutch outer mounting bolt threads.

Hold the flywheel with a flywheel holder, and tighten the starter clutch mounting torx bolts.

## TOOL:

Flywheel holder

07725-0040000

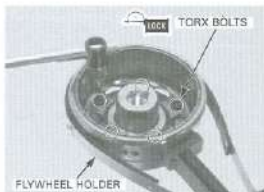
(Equivalent commercially available in U.S.A.)

**TORQUE:** 16 N·m (1.6 kgf·m, 12 lbf·ft)

Install the starter driven gear into the one-way clutch while turning it counterclockwise.

Recheck the one-way clutch operation.

You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.



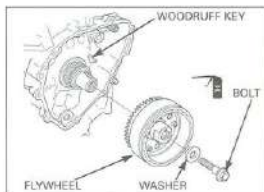
## FLYWHEEL INSTALLATION

Clean any oil from the crankshaft taper.  
Install the woodruff key on the crankshaft.



Install the flywheel aligning the key way in the flywheel with the woodruff key on the crankshaft.

Apply oil to the flywheel bolt threads and seating surface.  
Install the washer and flywheel bolt.



## ALTERNATOR/STARTER CLUTCH

Hold the flywheel using the flywheel holder, then tighten the bolt to the specified torque.

### TOOL:

Flywheel holder

07725-0040000

(Equivalent commercially available in U.S.A.)

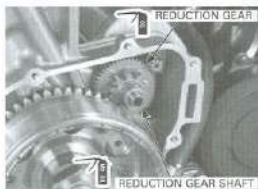
**TORQUE:** 103 N·m (10.5 kgf·m, 76 lbf·ft)



Apply molybdenum oil solution to the starter reduction gear shaft.

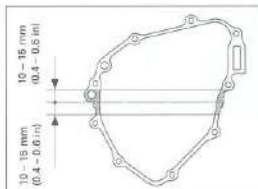
Apply oil to the starter reduction gear.

Install the starter idle gear and shaft onto the crankcase.



## ALTERNATOR COVER INSTALLATION

Apply sealant to the mating surface of the crankcase as shown.



Install the dowel pin and new gasket.



*The alternator cover (starter) is magnetically attached to the flywheel, be careful during installation.*

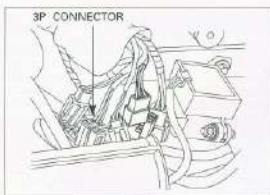
Install the alternator cover.

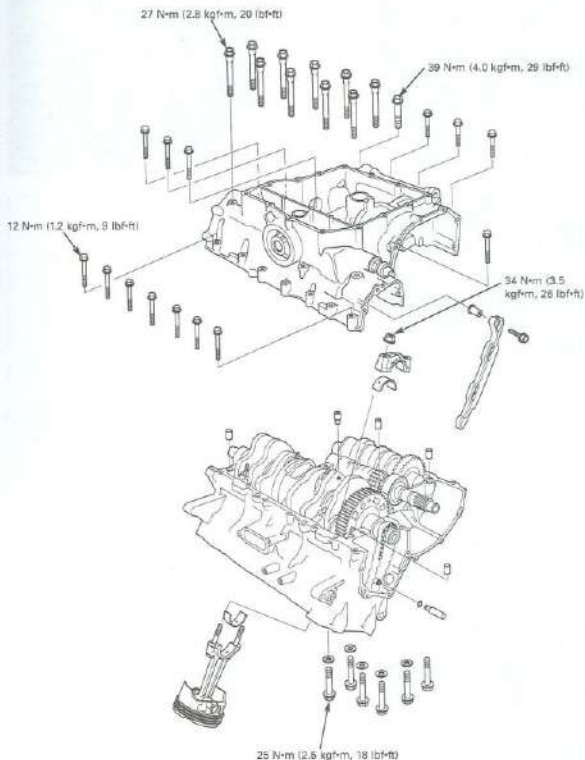
Install and tighten the bolts securely.



Connect the alternator 3P (Natural) connector.

Install the left side cover (page 2-2)





# 11. CRANKCASE/PISTON/CYLINDER

SERVICE INFORMATION	11-1	PISTON/CONNECTING ROD	11-4
TROUBLESHOOTING	11-2	CRANKSHAFT	11-7
CRANKCASE SEPARATION	11-3	CRANKCASE COMBINATION	11-12

## SERVICE INFORMATION

### GENERAL

- This section covers crankcase separation for service of the crankshaft and piston.
- The following parts must be removed before separating the crankcase.
  - Alternator/flywheel (Section 10)
  - Clutch/gearshift linkage (Section 9)
  - Cylinder head (Section 8)
  - Engine (Section 6)
  - Oil pump (Section 4)
- Mark and store the disassembled parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to ensure that the parts are installed in the correct locations during reassembly. If the inserts are improperly installed, they will block the oil hole, causing insufficient lubrication and eventual engine seizure.
- The connecting rod bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with a plastigauge to verify clearance. Apply molybdenum disulfide oil to the crank pin during assembly.

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		71.000 – 71.015 (2.7953 – 2.7963)	71.10 (2.795)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.05 (0.002)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	—
	Piston O.D.		70.965 – 70.985 (2.7939 – 2.7947)	70.90 (2.791)
	Piston O.D. measurement point		15 mm (0.6 in) from bottom of skirt	—
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.03 (0.670)
	Piston pin O.D.		16.993 – 17.000 (0.6690 – 0.6693)	16.98 (0.669)
	Piston-to-piston pin clearance		0.002 – 0.015 (0.0001 – 0.0006)	—
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.07 (0.003)
	Piston ring end gap	Top	0.28 – 0.38 (0.011 – 0.015)	0.5 (0.02)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
Oil (side rail)		0.2 – 0.7 (0.01 – 0.03)	0.9 (0.04)	
Cylinder-to-piston clearance			0.015 – 0.050 (0.0006 – 0.0020)	—
Connecting rod small end I.D.			17.016 – 17.034 (0.6699 – 0.6706)	17.04 (0.671)
Connecting rod-to-piston pin clearance			0.016 – 0.041 (0.0006 – 0.0016)	—
Crankpin oil clearance			0.030 – 0.052 (0.0012 – 0.0020)	0.06 (0.002)

### TORQUE VALUES

Crankcase bolt, 10 mm	39 N·m (4.0 kgf·m, 29 lbf·ft)	
9 mm	27 N·m (2.8 kgf·m, 20 lbf·ft)	Apply oil to the threads
8 mm	25 N·m (2.5 kgf·m, 18 lbf·ft)	
6 mm	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Connecting rod nut	33 N·m (3.4 kgf·m, 25 lbf·ft)	Apply oil to the threads

### TROUBLESHOOTING

#### Cylinder compression is too low, or engine is hard to start

- Blown cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder or piston
- Bent valve, or bent and deteriorated valve seat

#### Cylinder compression is too high, or engine overheats or knocks

- Carbon deposits on the cylinder head and/or piston crown

#### Piston sounds

- Worn Cylinder, piston and/or piston ring
- Worn piston pin hole and piston pin
- Worn connecting rod small end

#### Excessive smoke

- Worn, stuck or broken piston ring
- Worn valve stem seal

#### Excessive noise

- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing

#### Engine vibration

- Excessive crankshaft runout

## CRANKCASE SEPARATION

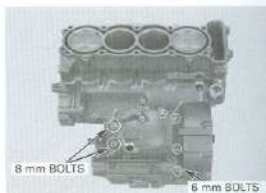
*Remove the speed sensor before separating the crankcase. Do not separate or assemble the crankcase with the speed sensor installed.*

Refer to Service Information (page 11-1) for removal of necessary parts before separating the crankcase.

Remove the sealing plug and O-ring.

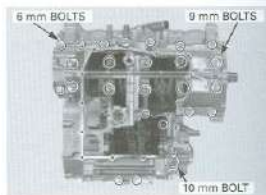


Loosen the seven 6 mm bolts and 8 mm bolts in a crisscross pattern in 2 or 3 steps. Remove the bolts and sealing washers.



Place the engine with the upper side down. Loosen the 6 mm bolts, 9 mm bolts and 10 mm bolts in a crisscross pattern in 2 or 3 steps. Remove the bolts and sealing washers.

Separate the lower crankcase from the upper crankcase. Remove the three dowel pins and two oil orifices.



Clean any sealant off of the crankcase mating surface.



### PISTON/CONNECTING ROD

*Be careful not to damage the crankpins, main journals and bearing inserts.*

#### PISTON/CONNECTING ROD REMOVAL

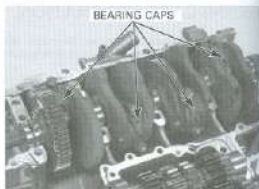
Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

Remove the connecting rod bearing cap nuts and bearing caps.

Tap the side of the cap lightly if the bearing cap is hard to remove.

Remove the crankshaft.

Remove the piston/connecting rod assembly from the top of the cylinder.



#### PISTON REMOVAL

Remove the piston pin clip with pliers.

Push the piston pin out of the piston and connecting rod, and remove the piston.



#### PISTON DISASSEMBLY

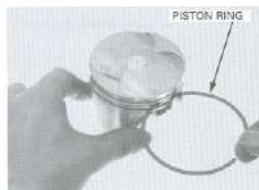
*Do not damage the piston ring by spreading the ends too far.*

Spread each piston ring and remove it by lifting up at a point opposite the gap.



*Clean carbon deposits from the ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the groove.*

Remove any carbon deposits from the piston ring grooves.





## PISTON INSPECTION

Temporarily install the piston rings to their proper position with the mark facing up.

Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

### SERVICE LIMITS:

Top: 0.08 mm (0.003 in)

Second: 0.07 mm (0.003 in)



Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

### SERVICE LIMITS:

Top: 0.5 mm (0.02 in)

Second: 0.7 mm (0.03 in)

Oil (side rail): 0.9 mm (0.04 in)



Measure the piston pin bore.

**SERVICE LIMIT: 17.03 mm (0.670 in)**



Measure the diameter of the piston at 15 mm (0.6 in) from the bottom and 90 degrees to the piston pin hole.

**SERVICE LIMIT: 70.90 mm (2.791 in)**



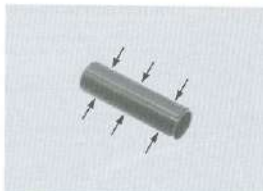
## CRANKCASE/PISTON/CYLINDER

Measure the O.D. of the piston pin.

**SERVICE LIMIT:** 16.98 mm (0.669 in)

Calculate the piston-to-piston pin clearance.

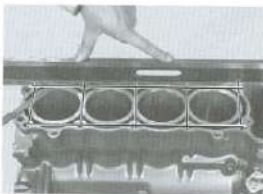
**STANDARD:** 0.002 – 0.015 mm (0.0001 – 0.0006 in)



### CYLINDER INSPECTION

Inspect the top of the cylinder for warpage.

**SERVICE LIMIT:** 0.05 mm (0.002 in)



### CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.

Measure the cylinder I.D. in X and Y axis at three levels.

Take the maximum reading to determine the cylinder wear.

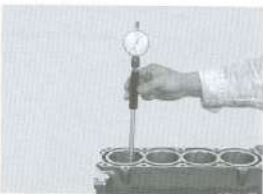
**SERVICE LIMIT:** 71.10 mm (2.795 in)

Calculate the piston-to-cylinder clearance.

Take a maximum reading to determine the clearance.

Refer to page 11-5 for measurement of the piston O.D.

**STANDARD:** 0.015 – 0.050 mm (0.0006 – 0.0020 in)



Calculate the taper and out of round at three levels in X and Y axis. Take the maximum reading to determine them.

## SERVICE LIMITS:

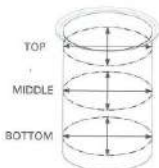
Taper: 0.10 mm (0.004 in)

Out of round: 0.10 mm (0.004 in)

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:  
0.25 mm (0.010 in)

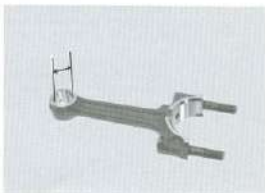
The piston to cylinder clearance for the oversize piston must be: 0.015 – 0.050 mm (0.0006 – 0.0020 in).



## CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

**SERVICE LIMIT: 17.03 mm (0.670 in)**



## SIDE CLEARANCE INSPECTION

Measure the connecting rod side clearance.

**SERVICE LIMIT: 0.30 mm (0.012 in)**

If the clearance exceeds the service limit, replace the connecting rod.

Recheck and if still out of limit, replace the crankshaft.



## CRANKPIN BEARING INSPECTION

Clean off any oil from the bearing inserts and crankpin.

Carefully install the crankshaft onto the upper crankcase.

Set the connecting rods onto the crankpin.

Put a strip of plastigauge lengthwise on the crankpin, avoiding the oil hole.



## CRANKCASE/PISTON/CYLINDER

Carefully install the bearing caps by aligning the I.D. code.

Apply engine oil to the connecting rod bearing cap nut threads and seating surfaces and install them. Tighten the cap nuts in 2 or 3 steps.

**TORQUE: 34 N·m (3.5 kgf-m, 25 lbf-ft)**



Remove the nuts and bearing cap.

Measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

If the oil clearance exceeds the service limit, select the correct replacement bearings.

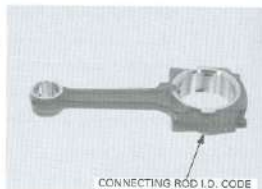


### CRANKPIN BEARING SELECTION

Record the connecting rod I.D. code number (1 or 2) or measure the I.D. with the bearing cap installed without bearing inserts.

If you are replacing the crankshaft, record the corresponding crankpin O.D. code number (A or B).

*Numbers (1 or 2) on the connecting rods are the codes for the connecting rod I.D.*



*Letters (A or B) on the crank weight are the codes for the crankpin O.D.s from left to right.*

If you are reusing the crankshaft, measure the crankpin O.D. with the micrometer.

Cross-reference the crankpin and rod codes to determine the replacement bearing color.



CRANKPIN BEARING SELECTION TABLE:

Unit: mm (in)

		CONNECTING ROD I.D. CODE		
		1	2	3
		39.000 - 39.006 (1.5354 - 1.5357)	39.006 - 39.012 (1.5357 - 1.5359)	39.012 - 39.018 (1.5359 - 1.5361)
CRANKPIN O.D. CODE	A	36.497 - 36.503 (1.4369 - 1.4371)	E (Yellow)	D (Green)
	B	36.491 - 36.497 (1.4367 - 1.4369)	D (Green)	C (Brown)
	C	36.485 - 36.491 (1.4364 - 1.4367)	C (Brown)	B (Black)

BEARING THICKNESS:

A (Blue)	Thick
B (Black)	↑
C (Brown)	↓
D (Green)	↓
E (Yellow)	Thin

**NOTICE**

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces, bearing cap and connecting rod.

Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning each tab with each groove.



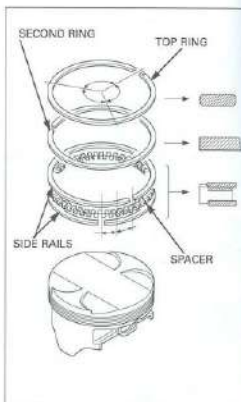
### PISTON ASSEMBLY

Carefully install the piston rings into the piston ring grooves with their marking facing up.

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking facing up.
- Do not mix the top and second rings; top ring is narrower than the second ring in width.

Stagger the piston ring end gaps 120° apart from each other.

Stagger the side rail end gaps as shown.



### PISTON INSTALLATION

Apply molybdenum oil solution to the connecting rod small end inner surfaces and piston pin outer surfaces.

Install the piston pin into the piston and connecting rod.

Install new piston pin clips into the grooves of the piston pin hole.

- Make sure that the piston pin clips seat securely.
- Do not align the piston pin clip end gap with the piston cut-out.

Apply engine oil to the cylinder wall, piston and piston rings.

Install the piston/connecting rod assembly into the cylinder using a commercially available piston ring compressor tool.

*Install the piston so that the "IN" mark faces the same direction as the oil hole in the connecting rod.*



**NOTICE**

Install the piston/connecting rod assembly with the piston "H" mark facing to the intake side.

- While installing the piston, be careful not to damage the top surface of the cylinder, especially around the cylinder bore.
- Be careful not to damage the cylinder sleeve and crankpin with the connecting rod bolt threads.

Use the handle of a plastic hammer to tap the piston into the cylinder.

Apply molybdenum oil solution to the crankpin bearing surfaces.

Install the bearing cap.

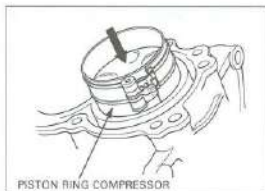
Make sure the ring compressor tool sits flush with the top surface of the cylinder.

Insure that the marks on the caps are aligned with the marks on the connecting rods.

Apply oil to the connecting rod nut threads and seating surfaces.

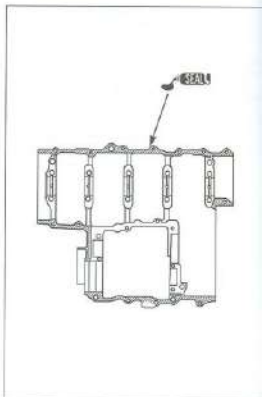
Install the connecting rod nuts and tighten the nuts gradually and alternately, then tighten them to the specified torque.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

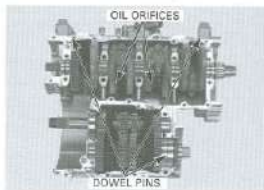


## CRANKCASE COMBINATION

Apply a light, but thorough, coating of liquid sealant to the crankcase mating surface except to the main bearing journal bolt (lower crankcase bolt, 8 mm) area and the oil passage area as shown.



Install the three dowel pins.  
Install oil orifices aligning their cut-out with the groove in the upper crankcase.





Install the lower crankcase onto the upper crankcase.  
Clean the new crankcase 9 mm bolts thoroughly with solvent and blow them dry.  
Apply oil to the 9 mm bolt threads and seating surface and install them.  
Install the 10 mm bolt, 6 mm bolts.

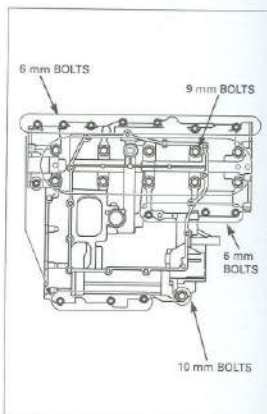
Make sure the upper and lower crankcase are seated securely.

From the inside to outside, tighten the lower crankcase 9 mm bolts (main journal bolts) in a crisscross pattern in 2 or 3 steps.

**TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)**

Tighten the 10 mm bolt to the specified torque, and then tighten 6 mm.

**TORQUE: 10 mm bolt: 39 N·m (4.0 kgf·m, 29 lbf·ft)**  
**6 mm bolt: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



*The sealing washer locations are indicated on the upper crankcase using the "A" mark.*

Install the upper crankcase 8 mm bolts and 6 mm bolts with new sealing washers.

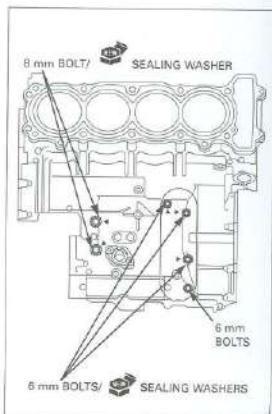
Tighten the 6 mm bolts in a crisscross pattern in 2 or 3 steps.

**TORQUE: 24 N·m (2.4 kgf·m, 17 lbf·ft)**

Tighten the 8 mm bolts in a crisscross pattern in 2 or 3 steps securely.

Apply a locking agent to the set plate bolt threads.  
Install the mainshaft bearing set plate with its "OUT SIDE" mark facing out.  
Install and tighten the bolts to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



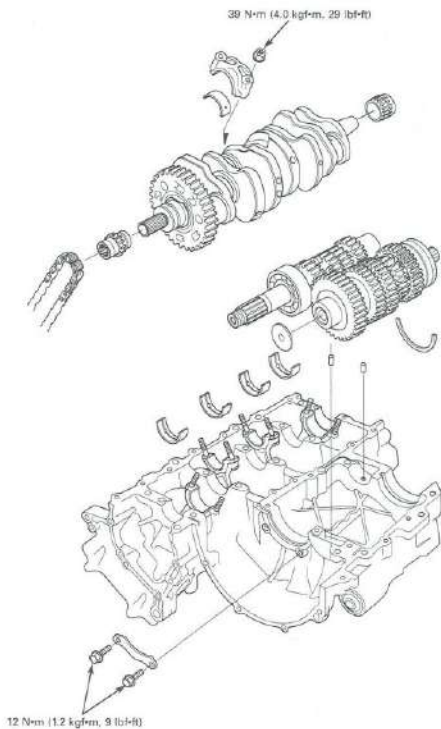
## CRANKCASE/PISTON/CYLINDER

Apply clean engine oil to the new O-ring and install it to the sealing plug.

Install the sealing plug to the crankcase.

Install the removed parts in the reverse order of removal.





# 12. CRANKSHAFT/TRANSMISSION

## SERVICE INFORMATION TROUBLESHOOTING

12-1  
12-2

## CRANKSHAFT TRANSMISSION

12-3  
12-9

## SERVICE INFORMATION

### GENERAL

- The crankcase must be separated to service the crankshaft and transmission. Refer to section 11 for crankcase separation/assembly.
- Be careful not to damage the crankshaft main journal bearing while removing or installing the crankshaft.
- Mark and store the disassembled parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to ensure that the parts are in their correct locations during reassembly. If the inserts are improperly installed, they will block the oil hole, causing insufficient lubrication and eventual engine seizure.
- The main journal bearing inserts are a select fit and are identified by color codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with a plastigauge to verify clearance. Apply molybdenum disulfide oil to the main journal during assembly.

### SPECIFICATIONS

Unit: mm (in.)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout		—	0.30 (0.012)
	Main journal oil clearance		0.017 – 0.035 (0.0007 – 0.0014)	0.04 (0.002)
Transmission	Gear I.D.	M5, M6	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1	24.000 – 24.021 (0.9449 – 0.9547)	24.04 (0.946)
		C2, 3, 4	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
	Bushing O.D.	M5, 6	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C2	30.955 – 30.980 (1.2187 – 1.2197)	30.93 (1.218)
		C3, 4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Bushing I.D.	M5	24.985 – 25.006 (0.9837 – 0.9845)	25.02 (0.985)
		C2	27.995 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
	Gear-to-bushing clearance	M5, 6	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C2	0.020 – 0.070 (0.0008 – 0.0028)	0.11 (0.004)
		C3, 4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O.D.	M5	24.967 – 24.980 (0.9830 – 0.9835)	24.96 (0.983)
		Clutch outer guide	24.980 – 24.993 (0.9835 – 0.9840)	24.96 (0.983)
	Countershaft O.D.	C2	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)
		C2	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)

### TORQUE VALUES

Connecting rod nut  
Mainshaft bearing set plate bolt

33 N•m (3.3 kgf•m, 25 lbf•ft)  
12 N•m (1.2 kgf•m, 9 lbf•ft)

Apply oil to the threads and seating surface.  
Apply a locking agent to the threads.

### TOOLS

Driver, 40 mm I. D.  
Attachment, 25 mm I.D.  
Attachment "B" collar

07746-0030100  
07748-0030200  
07964-MB00200

### TROUBLESHOOTING

#### Excessive noise

- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing

#### Hard to shift

- Improper clutch operation
- Incorrect transmission oil weight
- Incorrect clutch adjustment
- Bent shift fork
- Bent fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Bent shift spindle

#### Transmission jumps out of gear

- Worn gear dogs and slots
- Bent fork shaft
- Broken shift drum stopper
- Worn or bent shift forks
- Broken shift linkage return spring

#### Engine vibration

- Excessive crankshaft runout

## CRANKSHAFT

*Be careful not to damage the crankpin, main journal and bearing inserts.*

### REMOVAL

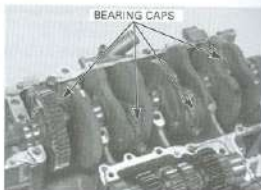
Mark the bearing caps and bearings as you remove them to indicate the correct cylinder for reassembly.

Remove the connecting rod bearing cap nuts and bearing caps.

Tap the side of the cap lightly if the bearing cap is hard to remove.

Remove the crankshaft.

Remove the main journal bearings from both the crankcases.

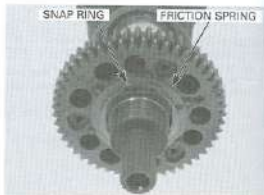


Check the primary drive gear and sub-gear teeth for abnormal wear or damage.

### PRIMARY DRIVE SUB-GEAR REMOVAL

Remove the special snap ring and friction spring.

Remove the primary drive sub-gear, gear springs and stopper pins.

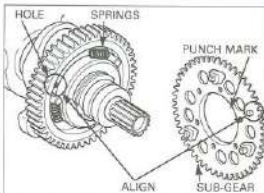


### PRIMARY DRIVE SUB-GEAR INSTALLATION

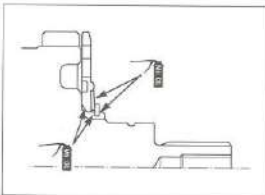
Install the stopper pins and gear springs onto the primary drive gear as shown.

Apply molybdenum oil solution to the sub-gear sliding surface and friction spring sliding surface. Temporarily install the sub-gear by aligning the punch mark with the hole in the primary drive gear.

Install the friction spring onto the sub-gear.

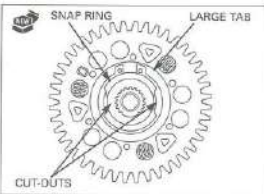


Install the sub-gear onto the primary drive gear so that it evenly touches the primary drive gear by prying the sub-gear with a 5 mm pin or screwdriver that is the stoppers on the reverse side of the sub-gear are pushed against the gear springs.



*Install with the large tab facing the right and the chamfered side facing the gear.*

Install a new snap ring into the ring groove in the crankshaft securely with the end gap at right angle to the crankshaft cut-outs by aligning the large tab edge with the sub-gear groove as shown.



## STARTER CLUTCH NEEDLE BEARING REPLACEMENT

To protect the crankshaft main journal from the bearing puller claws, cover the mainshaft journal properly; worn main journal bearings are usable protectors.

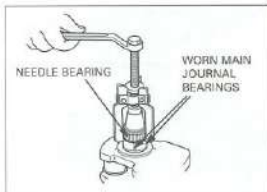
Remove the needle bearing with a commercially available universal bearing puller.

### TOOL:

Universal bearing puller

07631-0010000

(Equivalent commercially available)



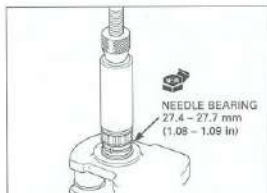
Press with the marking side facing up.

Press a new needle bearing onto the crankshaft using a hydraulic press and special tools until its edge is flush with the groove in the crankshaft. Make sure that the height from the crankshaft end is 27.8 – 27.9 mm (1.09 – 1.10 in).

### TOOLS:

Driver shaft B

07954-MB00200



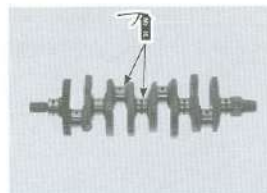
## INSTALLATION

Do not get the molybdenum oil solution on the connecting rod bolts and bearing cap nuts.

Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper crankcase and the crankpin bearing sliding surfaces on the connecting rods.

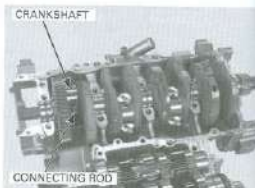


Apply molybdenum oil solution to the thrust surfaces of the crankshaft as shown.





Lower all pistons to the top dead center to avoid damaging the crankpin by the connecting rod bolts. Carefully install the crankshaft onto the upper crankcase. Set the connecting rods onto the crankpins.



### INSPECTION

Hold both ends of the crankshaft. Set a dial gauge on the center main journal of the crankshaft. Rotate the crankshaft two revolutions and read the runout.

**SERVICE LIMIT:** 0.30 mm (0.012 in)



## MAIN JOURNAL BEARING

### NOTICE

*Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

Remove the crankshaft (page 12-3).

### BEARING INSPECTION

Inspect the main journal bearing inserts on the upper and lower crankcase for unusual wear or peeling. Check the bearing tabs for damage.



### OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and main journals. Install the crankshaft onto the upper crankcase. Put a strip of plastigauge lengthwise on each main journal avoiding the oil hole.



*Do not rotate the crankshaft during inspection.*

Install the dowel pins and oil orifices.  
Carefully install the lower crankcase on the upper crankcase.  
Apply engine oil to the main journal 8 mm bolt threads and seating surfaces and install them.  
Tighten the 8 mm bolts in a crisscross pattern in 2 or 3 steps.

**TORQUE: 27 N·m (2.8 kgf-m, 20 lbf-ft)**



Remove the 8 mm bolts and lower crankcase.  
Measure the compressed plastigauge at its widest point on each main journal to determine the oil clearance.

**SERVICE LIMITS: 0.04 mm (0.002 in)**

If main bearing clearance exceeds the service limit, select the correct replacement bearings.



Letters (A, B or C) on the left side of upper crankcase are the codes for the bearing support I.D.s from left to right.

## BEARING SELECTION

Record the crankcase bearing support I.D. code letters from the pad on the left side of the upper crankcase as shown.



Numbers (1, 2 or 3) on the crank weight are the codes for the main journal O.D.s from left to right.

Record the corresponding main journal O.D. code numbers from the crank weight.

Cross reference the main journal and bearing support codes to determine the replacement bearing color code.



MAIN JOURNAL BEARING SELECTION TABLE:

Unit: mm (in)

			BEARING SUPPORT I.D. CODE		
			A	B	C
			37.000 - 37.006 (1.4566 - 1.4569)	37.006 - 37.012 (1.4569 - 1.4572)	37.012 - 37.018 (1.4572 - 1.4574)
CRANKSHAFT O.D. CODE	1	34.000 - 34.006 (1.3380 - 1.3388)	E (Pink)	D (Yellow)	C (Green)
	2	33.994 - 34.000 (1.3383 - 1.3386)	D (Yellow)	C (Green)	B (Brown)
	3	33.988 - 33.994 (1.3361 - 1.3363)	C (Green)	B (Brown)	A (Black)

**BEARING THICKNESS:**

A (Black) Thick  
 B (Brown): ↑  
 C (Green): ↓  
 D (Yellow): ↓  
 E (Pink) Thin

**NOTICE**

After selecting new bearings, recheck the clearance with a pistongauge. Incorrect clearance can cause severe engine damage.



**BEARING INSTALLATION**

Clean the bearing outer surfaces and crankcase bearing supports.

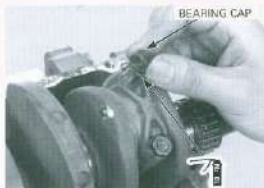
Install the main journal bearing inserts onto the crankcase bearing supports, aligning each tab with each groove.



Install the crankshaft.



Apply molybdenum oil solution to the crankpin bearing sliding surfaces on the bearing caps. Install the bearing caps by aligning the I.D. code on the connecting rod and bearing cap. Be sure each part is installed in its original position, as noted during removal.



Apply oil to the bearing cap nut threads and seating surfaces and install the cap nuts. Tighten the nut in 2 or 3 steps and torque them.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Assemble the crankcase halves (page 11-12).

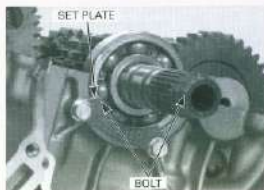


## TRANSMISSION

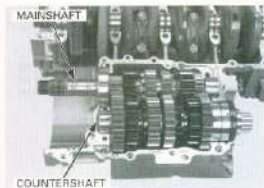
### REMOVAL/DISASSEMBLY

Separate the crankcase halves (page 11-3).

Remove the bolts and bearing set plate.  
Remove the mainshaft and countershaft assemblies.



Remove the mainshaft and countershaft assemblies.

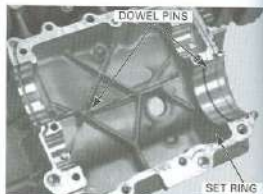


## CRANKSHAFT/TRANSMISSION

Remove the dowel pins and countershaft bearing set ring.

Disassemble the mainshaft and countershaft.  
Clean all disassembled parts in solvent thoroughly.

Check the mainshaft and countershaft needle bearings for abnormal wear or damage.



Check the gear shifter groove for abnormal wear or damage.



Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.

Measure the I.D. of each gear.

### SERVICE LIMITS:

M5, M6: 28.04 mm (1.104 in)

C1: 24.04 mm (0.946 in)

C2, C3, C4: 31.04 mm (1.222 in)



Measure the O.D. of each gear bushing.

### SERVICE LIMITS:

M5, M6: 27.94 mm (1.100 in)

C2: 30.93 mm (1.218 in)

C3, C4: 30.93 mm (1.218 in)

Calculate the gear-to-bushing clearance.

### SERVICE LIMITS:

M5, M6: 0.10 mm (0.004 in)

C2: 0.11 mm (0.004 in)

C3, C4: 0.11 mm (0.004 in)



Check the mainshaft and countershaft for abnormal wear or damage.

Measure the mainshaft O.D. at the M5 gear.

**SERVICE LIMIT: 24.96 mm (0.983 in)**

Measure the countershaft O.D. at the C2 gear.

**SERVICE LIMIT: 27.96 mm (1.101 in)**

Calculate the gear bushing-to-shaft clearance.

**SERVICE LIMITS:**

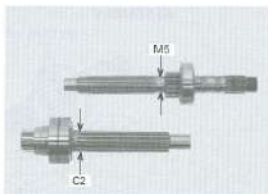
M5: 0.08 mm (0.003 in)

C2: 0.08 mm (0.003 in)

Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the shaft.

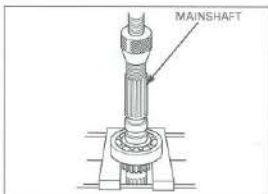
Remove and discard the mainshaft bearing if the race does not turn smoothly, quietly, or fits loosely on the mainshaft.

Replace the countershaft, collar, and bearing as an assembly if the race does not turn smoothly, quietly, or fits loosely on the countershaft.



**MAINSHAFT BEARING REPLACEMENT**

Press out the mainshaft from the bearing using a hydraulic press.



Install a new mainshaft bearing onto the mainshaft by pressing the mainshaft bearing inner race using the special tools.

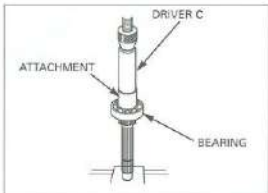
**TOOLS:**

Inner driver C

Attachment, 25 mm I.D.

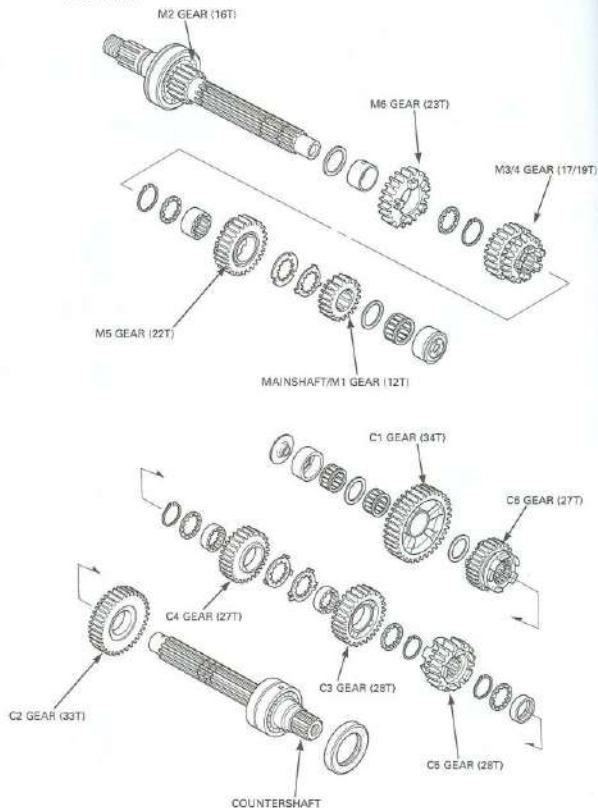
07746-0030100

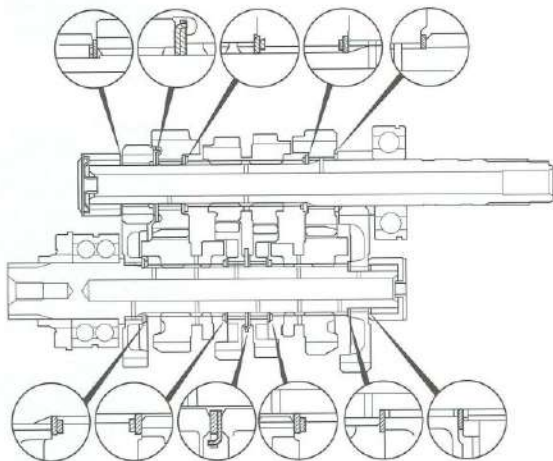
07746-0030200



Install with the groove side facing up.

ASSEMBLY

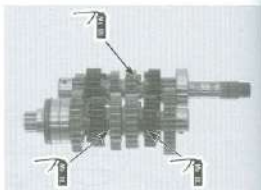




- Align the lock washer tabs with the spline washer grooves.
- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap ring so that its end gap aligns with the groove in the splines.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.



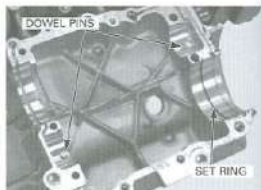
Assemble the transmission gear and shafts.  
Coat each gear with clean engine oil and check for smooth movement.  
Align the oil holes in the M6 bushing and mainshaft, and the C3, C4 spline bushings and countershaft.



### INSTALLATION

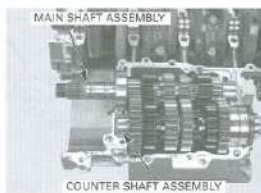
Apply molybdenum oil solution to the shift fork grooves in the M3/4, C5 and C6 gear.

Install the dowel pins in the upper crankcase holes.  
Install the countershaft bearing set ring into the upper crankcase groove.



Install the mainshaft and countershaft by aligning the countershaft bearing groove with the set ring on the crankcase, and aligning the bearing cap holes with the dowel pins.

Also align the countershaft bearing stopper pin with the groove in the crankcase.

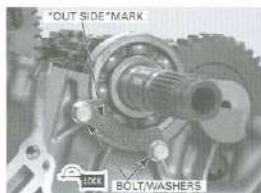


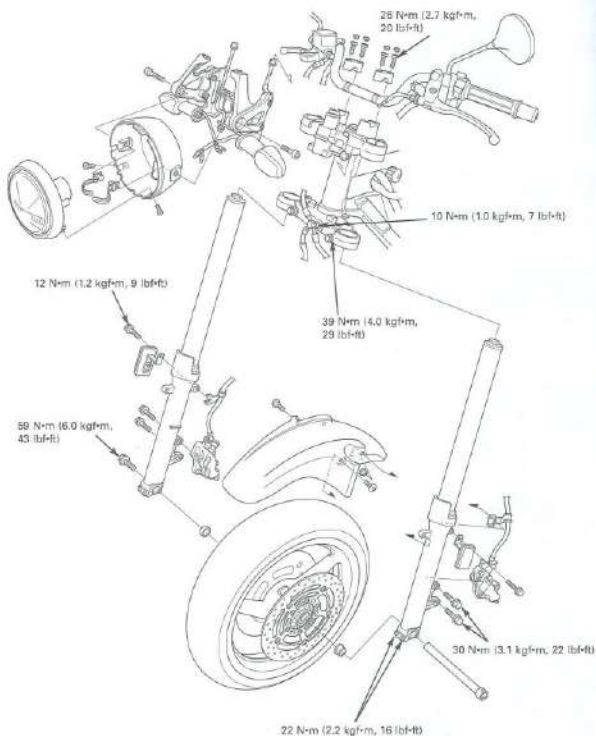
Apply a locking agent to the mainshaft bearing set plate bolt threads.

Install the mainshaft bearing set plate with its "OUT SIDE" mark facing out and tighten the bolts to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Assemble the crankcase (page 11-12).





# 13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-10
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## SERVICE INFORMATION

### GENERAL

- When servicing the front wheel, fork or steering stem, support the motorcycle using a safety stand or hoist.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the front wheel installation, check the brake operation by applying the brake lever.
- Refer to section 15 for brake system information.
- Use only tires marked "TUBELESS" and tubeless valves on rims marked "TUBELESS TIRE APPLICABLE".

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	—
	Driver and passenger	260 kPa (2.50 kgf/cm <sup>2</sup> , 38 psi)	—
Axle runout		—	0.2 (0.01)
Wheel run runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balance weight		—	60 g (2.1 oz) max.
Fork	Spring free length	282.3 (11.1)	276.7 (10.89)
	Tube runout	—	0.25 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid 5S-8	—
	Fluid level	195 (8.1)	—
	Fluid capacity	482 ± 2.5 cm <sup>3</sup> (15.7 ± 0.08 US oz, 16.3 ± 0.09 Imp oz)	—
Steering head bearing pre-load		10 – 15 Nm (1.0 – 1.5 kgf)	—

## FRONT WHEEL/SUSPENSION/STEERING

### TORQUE VALUES

Front brake disc bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	ALOC bolt; replace with a new one
Front axle bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Front axle holder flange bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front brake hose clamp flange bolt (left fork)	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake hose clamp flange bolt (right fork)	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Fork bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork top bridge pinch socket bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fork bottom bridge pinch flange bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Steering bearing adjustment nut	25 N·m (2.5 kgf·m, 18 lbf·ft)	Apply oil to the threads and seating surface
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	See page 13-29
Front brake hose clamp bolt (steering stem)	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt; replace with a new one

### TOOLS

Bearing remover shaft	07GGD-0010100
Bearing remover head, 20 mm	07748-0050600
Driver	07749-0010000
Attachment, 42 X 47 mm	07748-0010300
Pilot, 20 mm	07748-0040500
Fork seal driver weight	07947-KA50100
Fork seal driver attachment	07947-KA40200
Steering stem socket	07916-3710101
Ball race remover set	07953-MJ10000
– Remover attachment,	07953-MJ10100
– Driver shaft	07953-MJ10200
Steering stem driver	07946-MB00000
Ball race remover	07953-3710500
Ball race remover	07953-4250002

### TROUBLESHOOTING

#### Hard steering

- Steering head bearing adjustment nut too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure

#### Steers to one side or does not track straight

- Damaged or loose steering head bearings
- Bent forks
- Bent axle
- Wheel installed incorrectly
- Bent frame
- Worn or damaged wheel bearings
- Worn or damaged swingarm pivot bearings

#### Front wheel wobbling

- Bent rim
- Worn or damaged front wheel bearings
- Faulty tire
- Unbalanced front tire and wheel

#### Front wheel turns hard

- Faulty front wheel bearing

- Bent front axle
- Front brake drag

#### Soft suspension

- Insufficient fluid in fork
- Incorrect fork fluid weight
- Weak fork springs
- Insufficient tire pressure

#### Hard suspension

- Bent fork tubes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

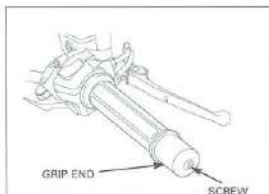
#### Front suspension noise

- Insufficient fluid in fork
- Loose fork fasteners

## HANDLEBARS

## HANDLEBAR REMOVAL

Remove the screw from the right grip end.

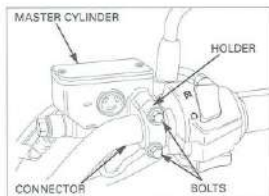


Remove the right rearview mirror.

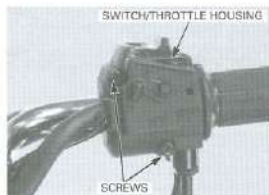
Disconnect the front brake light switch wire connectors from the switch.

Disconnect the front brake switch wire connectors from the switch.

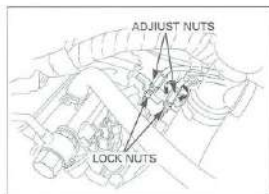
Remove the master cylinder holder bolts, holder and master cylinder assembly.



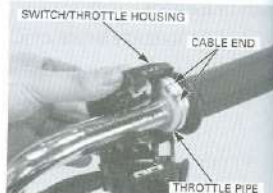
Remove the right handlebar switch/throttle housing screws.



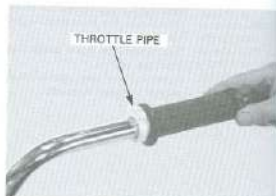
Loosen the throttle cable lock nuts and adjusting nut.



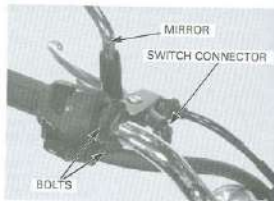
Disconnect the throttle cable ends from the throttle pipe and remove the housing.



Remove the throttle pipe.



Remove the right rearview mirror. Disconnect the clutch switch wire connectors from the switch. Remove the clutch lever bracket holder bolts, holder and clutch lever bracket assembly.



Remove the screws and left handlebar switch housing.



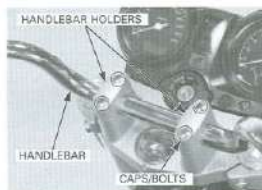
Remove the left handlebar switch housing.



Remove the screw from the left grip end.



Remove the caps, bolts and handlebar upper holders.  
Remove the handlebar.



## INSTALLATION

Install the handlebar and upper holders with their punch marks facing forward.

Temporarily tighten the upper holder socket bolts.

Loosen the upper holder socket bolts and align the punch marks on the handlebar with the slits of the handlebar holders.

Tighten the forward bolts first, then tighten the rear bolts.

**TORQUE:** 26 N·m (2.7 kgf·m, 20 lbf·ft)



## FRONT WHEEL/SUSPENSION/STEERING

Install the caps to the handlebar upper holder bolts.

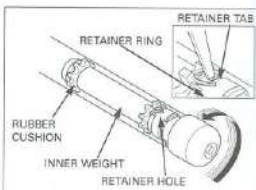


### INNER WEIGHT REPLACEMENT

Remove the grip from the handlebar. Straighten the weight retainer tab with a screwdriver or punch.

*Apply lubricant spray through the tab locking hole to the rubber for easy removal.*

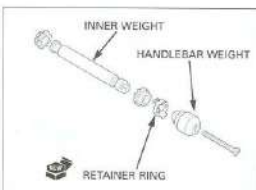
Temporarily install the grip end and screw, then remove the inner weight by turning the grip end.



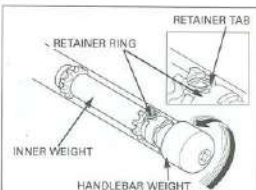
Remove the grip end from the inner weight. Discard the retainer and grip end screw.

Install the new retainer to the inner weight.

Install the grip end onto the inner weight, aligning its boss with the slot in the inner weight. Install a new grip end mounting screw.

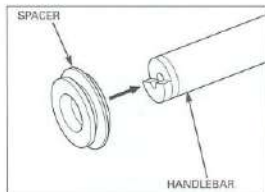


Insert the inner weight assembly into the handlebar. Turn the inner weight and hook the retainer tab with the hole in the handlebar.





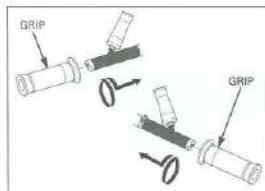
Install the left handlebar switch spacer onto the left handlebar.



Apply Honda Bond A or equivalent adhesive to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.

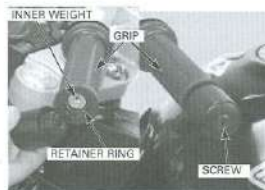
Wait 3 – 5 minutes and install the grip. Rotate the grip for even application of the adhesive.

*Allow the adhesive to dry for an hour before using.*



Install the grip end onto the inner weight, aligning its boss with the slot in the inner weight. Install a new grip end mounting screw to the specified torque.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**



*Install the spacer into the handlebar switch groove.*

Install the left handlebar switch housing, aligning its locating pin with the hole in the handlebar.



## FRONT WHEEL/SUSPENSION/STEERING

Tighten the forward screw first, then the rear screw.

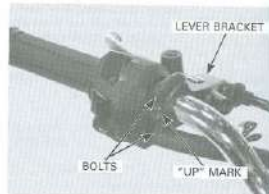


Install the clutch lever bracket assembly by aligning the end of the bracket with the punch mark on the handlebar.

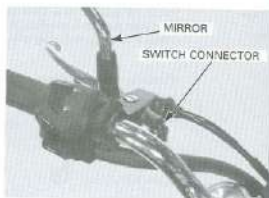
Install the clutch lever bracket holder with the "UP" mark facing up.

Tighten the upper bolt first, then the lower bolt.

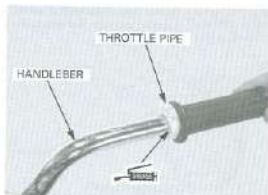
**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Connect the clutch switch wire connectors.  
Install the rearview mirror.



Apply grease to the throttle grip inner surface.  
Install the throttle grip to the handlebar.



Install the right handlebar switch/throttle housing by aligning its locating pin with the hole in the handlebar.

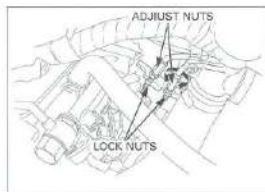
Apply grease to the throttle cable ends.  
Connect the throttle cables to the throttle grip.



Tighten the forward screw first, then the rear screw.  
Install the grip end (page 13-7).

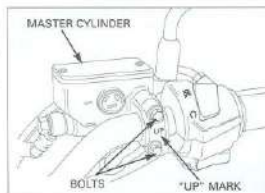


Adjust the throttle free play by turning the adjuster and tighten the lock nut.  
Recheck the throttle operation (page 3-4).



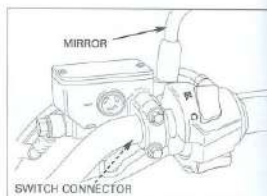
Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.  
Install the master cylinder holder with the "UP" mark facing up.  
Tighten the upper bolt first, then tighten the lower bolt.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



## FRONT WHEEL/SUSPENSION/STEERING

Connect the brake switch wire connectors.  
Install the rearview mirror.



## FRONT WHEEL

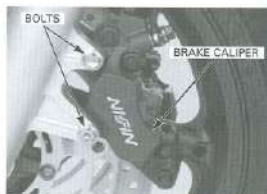
### REMOVAL

Support the motorcycle securely using a safety stand or a hoist.

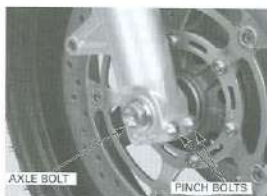
*Do not operate the brake lever after the brake caliper is removed.*

Remove the mounting bolts and both brake calipers.

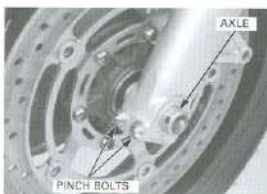
Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.



Loosen the right axle pinch bolts.  
Remove the axle bolt.



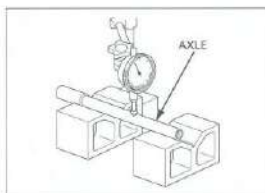
Loosen the left axle pinch bolts.  
Remove the axle and the front wheel.



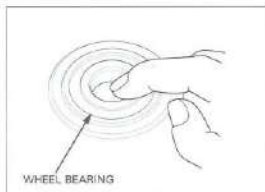
**INSPECTION****Axle**

Set the axle in a V-block and measure the runout. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT:** 0.2 mm (0.01 in)

**Wheel bearing**

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.



*Replace the bearings in pairs.*

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

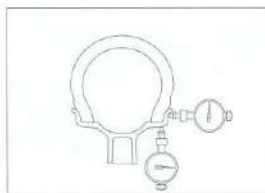
Install the new bearings into the hub using the special tools (page 13-12).

**Wheel rim runout**

Check the rim runout by placing the wheel in a turning stand.

Spin the wheel by hand, and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS:**

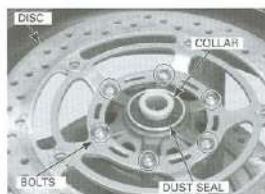
Radial: 2.0 mm (0.08 in)

Axial: 2.0 mm (0.08 in)

**DISASSEMBLY**

Remove the bolts and brake discs.

Remove the collars and dust seals.

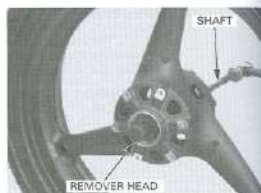


Install the bearing remover head into the bearing. From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

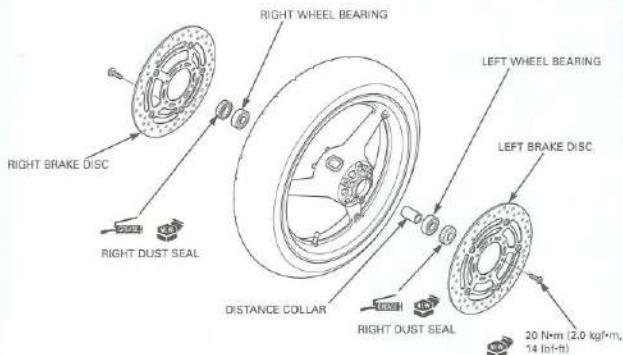
## TOOLS:

Bearing remover head, 20 mm 07746-0050600

Bearing remover shaft 07GGD-0010100



## ASSEMBLY



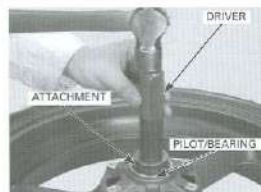
Drive in a new right bearing. Install the distance collar, then drive in the left bearing using the special tool.

## TOOLS:

Driver  
Attachment, 42 X 47 mm  
Pilot, 20 mm

07749-0010000  
07748-0010300  
07746-0040500

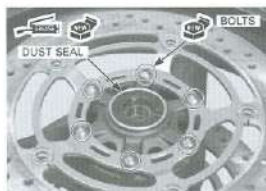
*Never install the old bearings. Once the bearings have been removed, they must be replaced with new ones.*



Install the brake discs with the arrow mark facing in the normal rotating direction.  
Install and tighten the new mounting bolts to the specified torque.

**TORQUE: 20 N·m (2.0 kgf-m, 14 lbf-ft)**

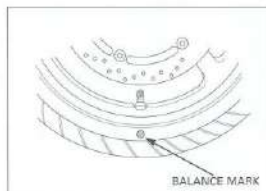
Apply grease to the dust seal lips, then install them into the wheel hub.



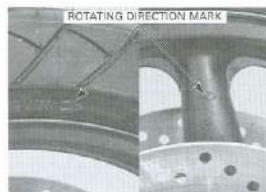
## WHEEL BALANCE

- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

*Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.*



Note the rotating direction marks on the wheel and tire.



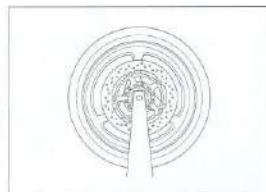
Mount the wheel, tire and brake disc assembly on an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install balance weights on the lightest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.

Do not add more than 60 g (2.1 oz) to the front wheel.



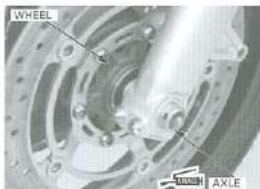
### INSTALLATION

Install the side collars.



Install the front wheel between the fork legs.

Apply a thin layer of grease to the front axle surface.  
Install the front axle from the left side.



Hold the axle and tighten the axle bolt to the specified torque.

**TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)**

Tighten the right axis pinch bolts to the specified torque.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



Install both brake callipers and tighten the new mounting bolts to the specified torque.

**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**





With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation by applying the brake lever.



Tighten the left axle pinch bolts to the specified torque.

**TORQUE: 22 N·m (2.2 kgf-m, 15 lbf-ft)**



Check the clearance between the brake disc and caliper bracket on each side after installation. The clearance should be at least 0.7 mm (0.03 in).



## FORK

### REMOVAL

- Remove the following:
- Front wheel (page 13-10)
  - Front fender (page 2-3)



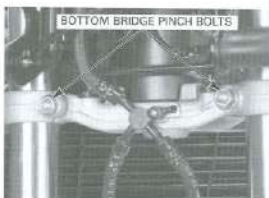
Loosen the top bridge pinch bolts.



When the fork leg will be disassembled, loosen the fork bolt, but do not remove it yet.



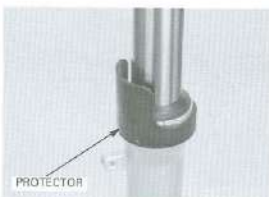
Loosen the fork bottom pinch bolts and remove the fork tube from the fork top bridge and steering stem.



*Be careful not to scratch the fork tube or damage the dust seal.*

### DISASSEMBLY

Remove the fork protector by prying it carefully using a screwdriver.



Remove the fork bolt from the fork tube.



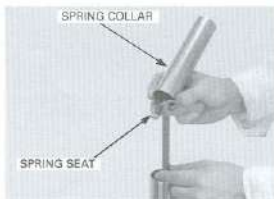
Hold the damper rod lock nut with a 14 mm spanner, then loosen and remove the fork bolt from the damper rod.

Remove the spring.

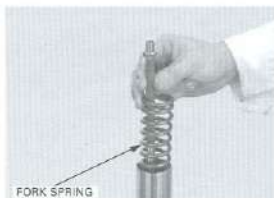


Remove the following:

- Spring collar
- Spring seat

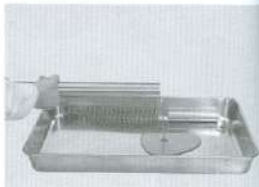


- Fork spring



## FRONT WHEEL/SUSPENSION/STEERING

Pour out the fork fluid by pumping the fork tube several times.



*If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring seat, onto collar and fork bolt.*

Hold the caliper bracket in a vice with soft jaws or a shop towel.

Remove the fork damper socket bolt and sealing washer.



Remove the dust seal.



*Do not scratch the fork tube sliding surface.*

Remove the oil seal stopper ring.



Remove the fork damper assembly and oil lock piece from the fork tube.



Pull the fork tube out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider. The slider bushing will be forced out by the fork tube bushing.

Remove the oil seal, back-up ring and guide bushing from the fork tube.



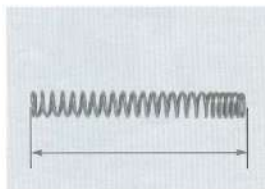
*Do not remove the fork tube bushing unless it is necessary to replace it with a new one.*

## INSPECTION

### Fork spring

Measure the fork spring free length.

**SERVICE LIMIT: 276.7 mm (10.89 in)**



### Fork tube/slider/damper

Check the fork tube and fork slider for score marks, scratches, or excessive or abnormal wear. Replace any components that are worn or damaged.

Check the fork damper for damage.

Check the oil lock valve for wear or damage.

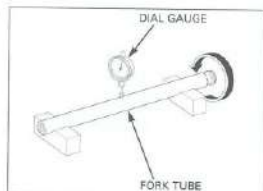
Replace the fork damper assembly, if any component are damaged.



## FRONT WHEEL/SUSPENSION/STEERING

Place the fork tube in a V-block and measure the runout. Actual runout is 1/2 the total indicator reading.

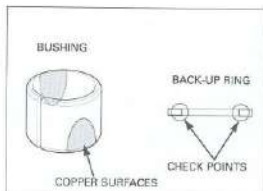
**SERVICE LIMIT:** 0.20 mm (0.008 in)



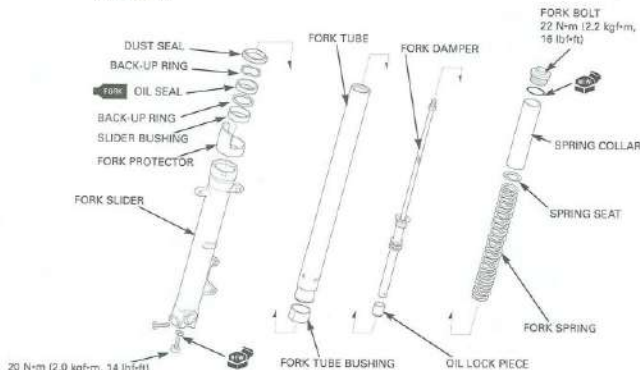
### Fork tube bushing

Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



## ASSEMBLY



Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them dry.

Install a new fork tube bushing if the tube bushing has been removed.

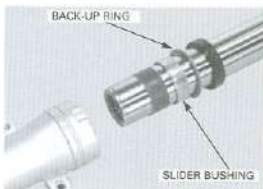
## NOTICE

- Be careful not to damage the fork tube bushing coating.
- Do not open the fork tube bushing more than necessary.
- Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install the new slider bushing being careful not to damage the coating of the bushing if it has been removed.

- Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install the slider bushing, back-up ring and new oil seal onto the fork slider.



Install the oil seal with its marked side facing up.

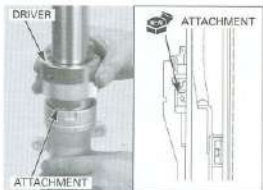
Install the fork slider into the fork tube.

Drive the oil seal in using the special tools.

## TOOL:

Fork seal driver weight 07947-KA50100

Fork seal driver attachment 07947-KA40200



Apply a locking agent to the fork socket bolt threads. Install the socket bolt with a new sealing washer.

Hold the axle holder in a vise with soft jaws or a shop towel.

Tighten the fork socket bolt to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



If the fork damper comes together with the socket bolt, temporarily install the fork spring, spring seat, onto collar and fork bolt.

Install the fork damper assembly and oil lock piece into the fork tube.



Install the stopper ring into the fork slider groove securely.



Install the dust seal.



Pour the specified amount of recommended fork fluid into the fork tube.

**RECOMMENDED FORK FLUID:**  
Pro Honda Suspension Fluid SS-8

**FORK FLUID CAPACITY:**  
 $463 \pm 2.5 \text{ cm}^3$  (15.7  $\pm$  0.08 US oz, 16.3  $\pm$  0.09 Imp oz)

Pump the damper rod several times.

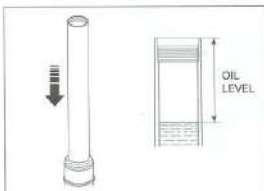




Be sure the oil level is the same in both forks.

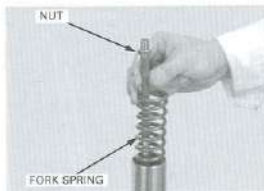
Measure the oil level from the top of the fork tube while compressing the tube all the way after stroking the fork tube slowly more than 5 times and the damper rod more than 10 times.

**FORK OIL LEVEL: 155 mm (6.1 in)**

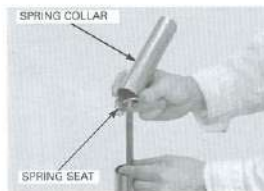


Pull the damper rod up and install the fork spring with the tapered end facing down.

Screw the damper rod end nut fully by hand.



Install the spring seat and spring collar.



Install a new O-ring onto the fork bolt.  
Apply fork fluid to the new O-ring.

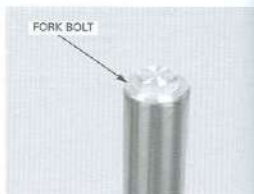
Hold the damper rod and screw the fork bolt onto the damper rod until it seats on the damper rod lock nut.

Hold the fork bolt and tighten the lock nut to the specified torque.

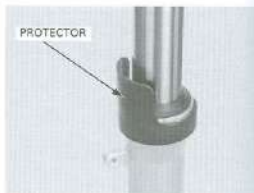
**TORQUE: 22 N·m (2.2 kgf-m, 16 lbf-ft)**



Screw the fork bolt in to the fork tube.



Install the fork protector onto the fork slider, aligning the protector boss with the groove in the fork slider.



### INSTALLATION

Install the fork tube into the bottom bridge.  
Align the top end of the fork tube with the upper surface of the top bridge.



Tighten the bottom bridge pinch bolt to the specified torque.

**TORQUE:** 39 N·m (4.0 kgf·m, 29 lbf·ft)



Tighten the fork bolt to the specified torque if it was removed.

**TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

Install the following:

- Front fender (page 2-3)
- Front wheel (page 13-14)



TOP BRIDGE PINCH BOLT

## STEERING STEM

### REMOVAL

Remove the following:

- Handlebar (page 13-3)
- front wheel (page 13-10)
- Combination meter (page 19-8)
- Fork (page 13-15)

Remove the socket bolts/nuts and headlight/meter mount stay.



SOCKET BOLTS

STAY

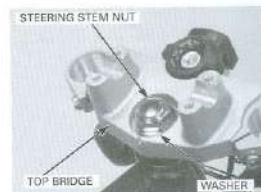
Remove the bolt and front brake hose clamp.



CLAMP

BOLTS

Remove the stem nut, washer and the top bridge.



STEERING STEM NUT

TOP BRIDGE

WASHER

Remove the turn signal light bracket from the steering stem.



Straighten the tabs of the lock washer.

Remove the lock washer and lock nut.



Remove the steering stem bearing adjusting nut using the special tool.

**TOOL:**

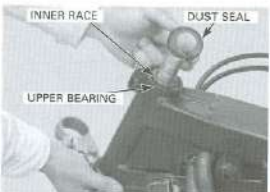
Steering stem socket

07916-3710101



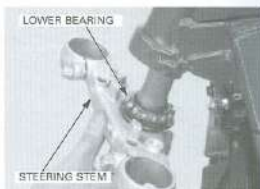
Remove the following:

- Dust seal
- Upper bearing inner race
- Upper bearing



Note the installation direction of the assembly base.

- Steering stem
- Lower bearing



## BEARING RACE REPLACEMENT

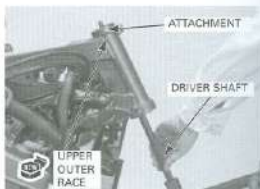
Replace the upper bearing outer races using the special tool.

### TOOLS:

- Ball race remover
- Ball race remover set
- Remover attachment
- Driver shaft

Always replace the bearing races as a set.

07953-4250002 or  
07953-MJ10000  
07946-MJ10100  
07946-MJ10200



Replace the lower bearing outer races using the special tool.

### TOOLS:

- Ball race remover
- Ball race remover

07953-3710500  
07953-4250002

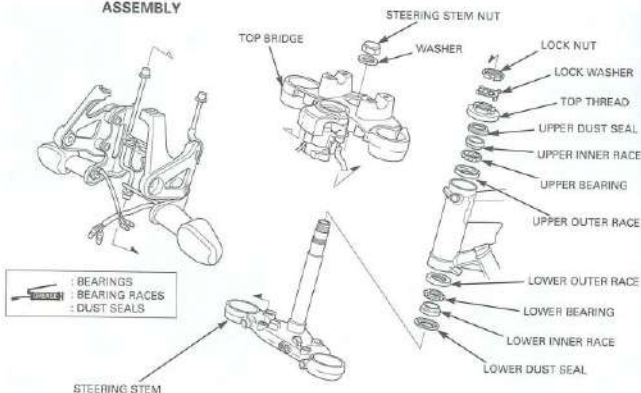


Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem. Remove the dust seal.



## ASSEMBLY

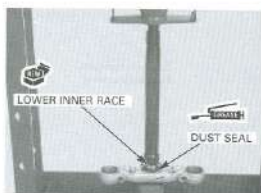


Apply grease to the new dust seal lips and install it over the steering stem.  
Install a new lower bearing inner race using a special tool and a hydraulic press.

### TOOL:

Steering stem driver

07946-MB00000



Remove the lower bearing outer race using the special tools.

### TOOLS:

Driver handle

07749-0010000

Attachment 42x47

07749-0010300

Remove the upper bearing outer race using the special tools.

### TOOLS:

Driver handle

07749-0010000

Attachment 42x47

07749-0010300

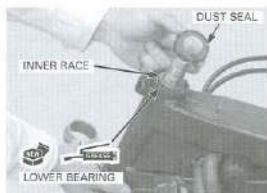


Apply grease to the lower bearing and bearing race.  
Insert the steering stem into the steering head pipe.



Apply grease to the upper bearing bearing race and dust seal lip.

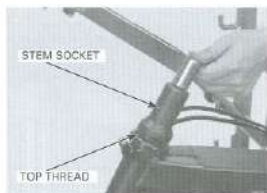
Install the upper bearing, upper inner race and dust seal.



Apply oil to the bearing adjustment nut threads.  
Install and tighten the stem bearing adjusting nut to the initial torque.

**TOOL:**  
**Steering stem socket** 07916-3710101

**TORQUE:** 25 N·m (2.5 kgf·m, 18 lbf·ft)



Move the steering stem right and left, lock-to-lock, five times to seat the bearings.  
Make sure that the steering stem moves smoothly, without play or binding; then loosen the top thread.



## FRONT WHEEL/SUSPENSION/STEERING

Retighten the bearing adjusting nut to the specified torque.

**TORQUE:** 25 N·m (2.5 kgf-m, 18 lbf-ft)

Recheck that the steering stem moves smoothly without play or binding.

Install the new lock washer onto the steering stem.

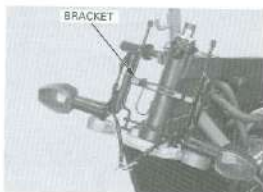
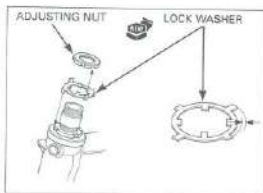
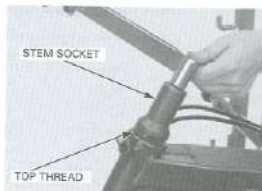
Align the tabs of the lock washer with the grooves in the adjustment nut and bend two opposite tabs (shorter) down into the adjustment nut grooves.

Install and finger tighten the lock nut.

Hold the lock nut and further tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bend the lock washer tabs up into the lock nut groove.

Install the turn signal light bracket.





Install the top bridge, stem nut and washer.



Temporarily install the front fork.

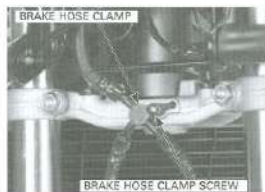
Tighten the steering stem nut to the specified torque.

**TORQUE:** 103 N·m (10.5 kgf·m, 76 lbf·ft)



Install the front brake hose clamp, tighten the bolt to the specified torque.

**TORQUE:** 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the headlight case/meter mount stay and tighten the socket bolt/nut.

Install the following:

- Front fork (page 13-15)
- Handlebar (page 13-5)
- Combination meter (page 19-8)



### STEERING HEAD BEARING PRE-LOAD

Jack-up the motorcycle to raise the front wheel off the ground.

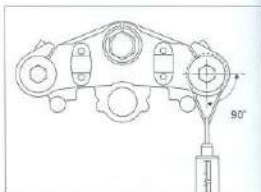
Position the steering stem to the straight ahead position.

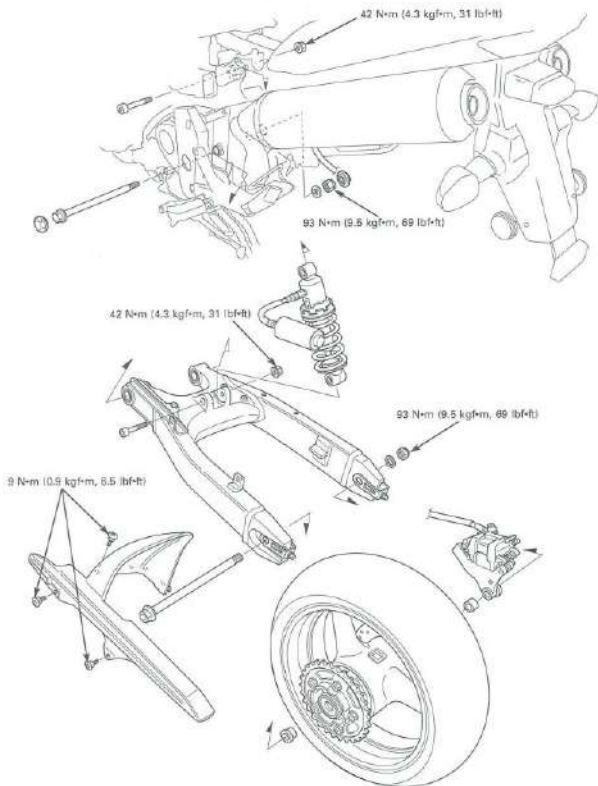
Hook a spring scale to the fork tube and measure the steering head bearing pre-load.

*Make sure that there is no cable or wire harness interference.*

The pre-load should be within 10 – 15 N·m (1.0 – 1.5 kgf·m).

If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.





# 14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-10
TROUBLESHOOTING	14-2	SWINGARM	14-14
REAR WHEEL	14-3		

## SERVICE INFORMATION

### GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the rear wheel installation, check the brake operation by applying the brake pedal.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- Before disposal of the shock absorber, release the nitrogen (page 14-13).
- When servicing the rear wheel and suspension, support the motorcycle using a safety stand or hoist.
- Use only tires marked "TUBELESS" and tubeless valves on rims marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.
- Refer to section 15 for brake system information.

## SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—	2.0 (0.08)
Cold tire pressure	Driver only		290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—
	Driver and passenger		290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—
Axle runout			—	0.2 (0.01)
Wheel rim runout	Radial		—	2.0 (0.08)
	Axial		—	2.0 (0.08)
Wheel balance weight			—	60 g (2.1 oz) max.
Drive chain	Size/link	D/D	DID525VM2-112LE	—
		RK	RKGB525RDZ1-112LE	—
	Slack		25 - 35 (1 - 1-3/8)	—

## REAR WHEEL/SUSPENSION

### TORQUE VALUES

Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt: replace with a new one
Final driven sprocket nut	109 N·m (11.0 kgf·m, 80 lbf·ft)	U-nut
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Rear shock absorber mounting nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	U-nut
Drive chain slider flange bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	ALOC bolt: replace with a new one
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut

### TOOLS

Bearing remover shaft	07GGD-0010100
Bearing remover head, 20 mm	07746-0050600
Driver	07749-0010000
Attachment, 32 X 35 mm	07746-0010100
Attachment, 42 X 47 mm	07746-0010300
Attachment, 52 X 55 mm	07746-0010400
Attachment, 37 X 40 mm	07746-0010200
Attachment, 22 X 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400
Pilot, 20 mm	07746-0040500
Pilot, 28 mm	07746-0041100
Attachment, 28 X 30 mm	07946-1870100
Bearing remover handle	07936-3710100
Bearing remover head	07936-3710600
Remover weight	07741-0010201
Outer driver, 37 mm	07ZMD-MBW0200

## TROUBLESHOOTING

### Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

### Rear suspension noise

- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

### Hard suspension

- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Incorrect swingarm pivot fasteners tightening
- Tire pressure too high

### Rear wheel wobbling

- Bent rim
- Worn or damaged rear wheel bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

### Rear wheel turns hard

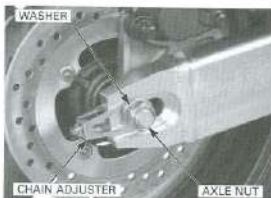
- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

# REAR WHEEL

## REMOVAL

Support the motorcycle using a safety stand or a hoist, raise the rear wheel off the ground.

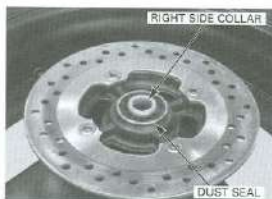
Remove the axle nut and washer.



Remove the rear axle.  
Derail the drive chain from the driven sprocket, then remove the rear wheel.



Remove the right side collar and dust seal from the wheel right side.



Remove the left side collar and dust seal from the wheel left side.

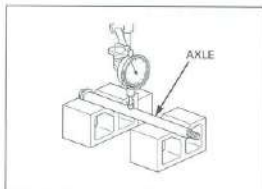


### INSPECTION

#### Axle

Place the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT: 0.2 mm (0.01 in)**

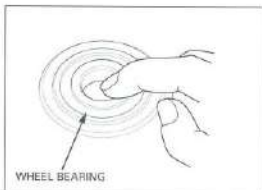


*Replace the wheel bearings in pairs.*

#### Wheel bearing

Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

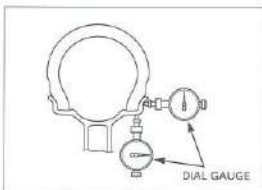
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



#### Wheel rim runout

Check the rim runout by placing the wheel in a turning stand. Spin the wheel slowly and read the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

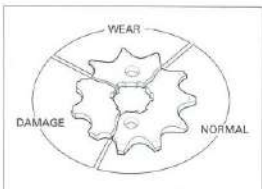
**SERVICE LIMITS: Radial: 2.0 mm (0.08 in)  
Axial: 2.0 mm (0.08 in)**



*If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket. Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.*

#### Driven sprocket

Check the condition of the final driven sprocket teeth. Replace the sprocket if worn or damaged.



# DISASSEMBLY

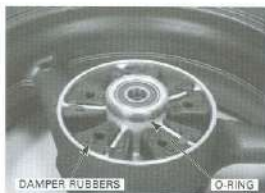
Remove the bolts and brake disc.



Remove the driven flange assembly from the left wheel hub.



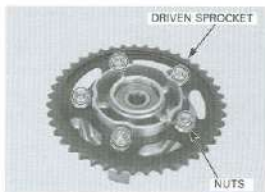
Remove the wheel damper rubbers.  
Remove the O-ring.



**Driven flange bearing removal**  
Loosen the driven sprocket nuts.

Remove the driven flange from the wheel hub, then  
remove the driven sprocket nuts and sprocket.

Remove the driven flange bearing and collar.





## REAR WHEEL/SUSPENSION

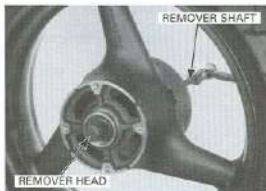
### Wheel bearing removal

Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

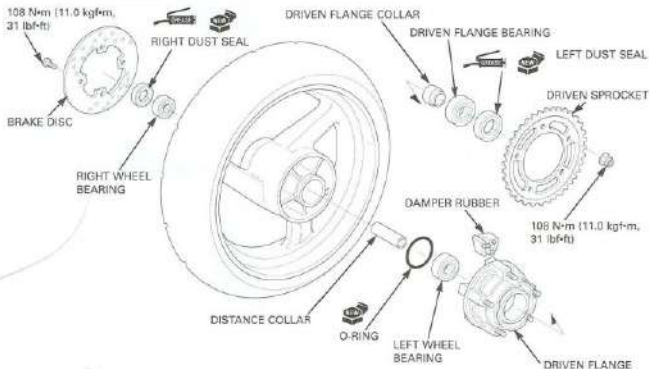
#### TOOLS:

Bearing remover head, 20 mm 07746-0050600

Bearing remover shaft 07746-0050100



### ASSEMBLY



### Wheel bearing installation

Drive in a new right bearing.

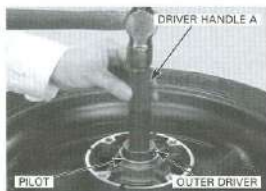
#### TOOLS:

Driver  
Attachment, 42 X 47 mm  
Pilot, 20 mm

07749-0010000

07746-0010300

07746-0040500



Never install the old bearings, once the bearings have been removed, the bearings must be replaced with new ones.

Install the distance collar

Drive in the left side bearing using the same tools.

Drive the driven flange bearing out using the special tools.

## TOOLS:

Driver

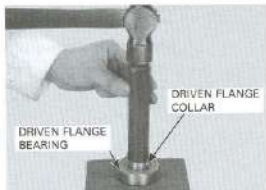
07745-0010000

Attachment, 28 X 30 mm

07746-1870100

Pilot, 20 mm

07746-0040500



## Driven flange bearing installation

Drive the new driven flange bearing into the driven flange using the special tools.

## TOOLS:

Driver

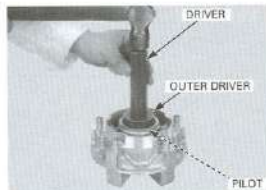
07745-0010000

Attachment, 52 X 55 mm

07746-0010400

Pilot, 20 mm

07746-0040500



Install the wheel damper rubbers into the wheel hub. Apply oil to the new O-ring and install it into the groove of the wheel hub.



If the driven sprocket was removed, install the driven sprocket and temporarily tighten the nuts.



## REAR WHEEL/SUSPENSION

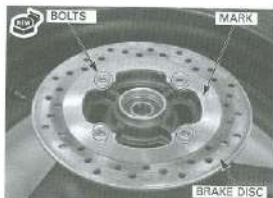
Install the driven flange assembly into the left wheel hub.

**TORQUE: 108 N·m (11.0kgf-m, 80 lbf-ft)**



Install the brake disc with its rotating direction mark facing out. Install and tighten the new bolts to the specified torque.

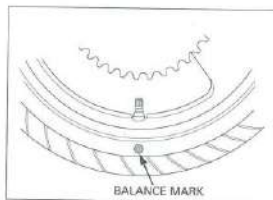
**TORQUE: 42 N·m (4.3 kgf-m, 31 lbf-ft)**



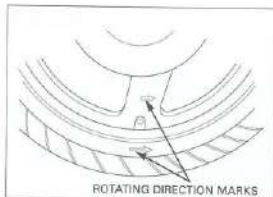
## WHEEL BALANCE

The wheel balance must be checked when the tire is remounted.

For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



Note the rotating direction marks on the wheel and tire.



Mount the wheel, tire and brake disc assembly on an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install balance weights on the lightest side of rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.

Do not add more than 60 g (2.1 oz) to the rear wheel.



## INSTALLATION

Apply grease and install the new dust seal to the right side.

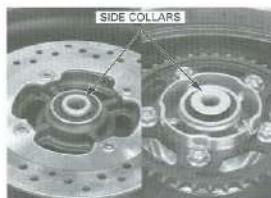


Apply grease and install the dust seal to the left side.



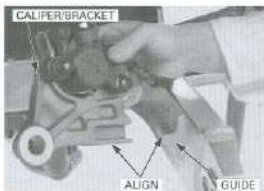
Apply grease to the side collars inside and grooves.

Install the side collars.



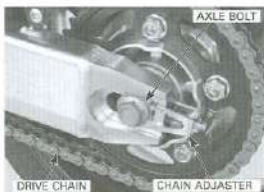
## REAR WHEEL/SUSPENSION

Install the rear brake caliper bracket onto the guide of the swingarm.



*Be careful not to damage the brake pads.*

Place the rear wheel into the swingarm. Install the drive chain over the driven sprocket. Install the rear axle from the left side.

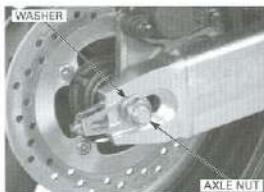


Install the washer and axle nut.

Adjust the drive chain slack (page 3-10).

Tighten the axle nut to the specified torque.

**TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)**



## SHOCK ABSORBER

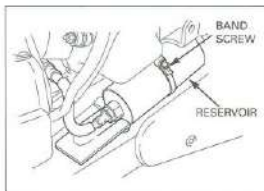
### REMOVAL

Remove the seat (page 2-2).

Remove the side cover (page 2-2).

Secure the motorcycle using a hoist or an equivalent.

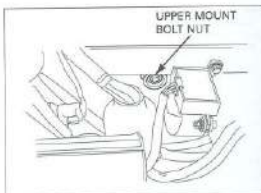
Loosen the shock absorber reservoir band screw and remove the reservoir from the inner fender.



Remove the shock absorber lower mounting bolt/nut.



Remove the shock absorber upper mounting bolt/nut and the shock absorber.



## INSPECTION

Check the damper unit, reservoir hose and reservoir for leakage or other damage.  
Check the upper joint bushing for wear or damage.

Inspect all the other parts for wear or damage.  
Replace the shock absorber assembly if necessary.



## NEEDLE BEARING REPLACEMENT

Remove the pivot collar and dust seals.



## REAR WHEEL/SUSPENSION

Press out the needle bearing out of the shock absorber lower mount using the special tools.

### TOOLS:

Driver

04949-3710001 or

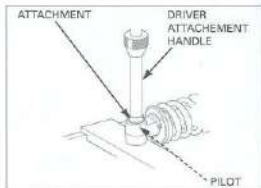
07946-MJ00100

Attachment, 22 X 24 mm

07746-0010800

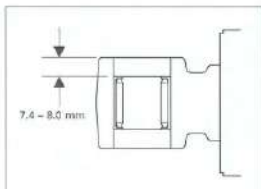
Pilot, 17 mm

07746-0040400



*Press the needle bearing into the lower mount with the marked side facing out.*

Press a new needle bearing into the lower mount so that the needle bearing surface is lower 7.4 - 8.0 mm (0.29 - 0.32 in) from the end of the lower mount using the same tools.



Apply grease to the new dust seal lips, install them into the lower mount.  
Install the pivot collar.



# SHOCK ABSORBER DISPOSAL PROCEDURE

Remove the damper reservoir cap.

Release the nitrogen from the reservoir by depressing the valve core.

## NOTICE

- Point the valve away from you to prevent debris getting in your eyes.
- Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber reservoir.

## INSTALLATION

Install the shock absorber into the frame with the reserve tank outlet facing to the left.  
Install the upper and lower mounting bolt/nut.  
Tighten the upper mounting nut to the specified torque.

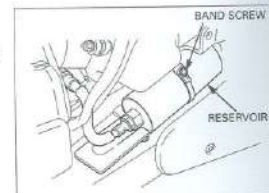
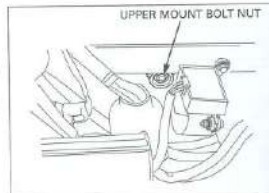
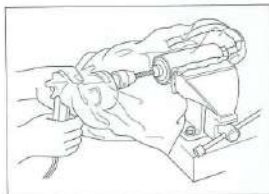
**TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)**

Tighten the lower mounting nut to the specified torque.

**TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)**

Install the reservoir into the reservoir band.  
Tighten the band screw securely.

Install the removed parts in the reverse order of removal.



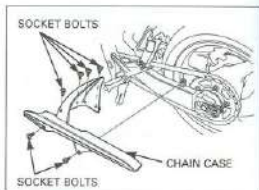


## SWINGARM

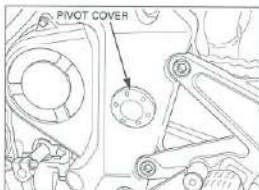
### REMOVAL

Remove the rear wheel (page 14-3).

Remove the socket bolts and drive chain case.

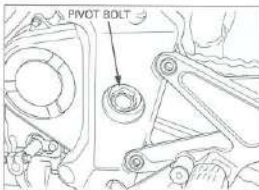


Remove the swingarm pivot cover.



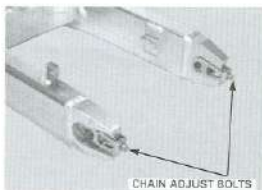
Remove the swingarm pivot nut and washer.

Remove the swingarm pivot bolt and swingarm.



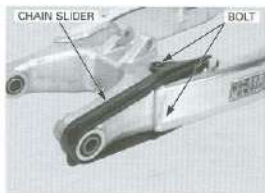
### DISASSEMBLY/INSPECTION

Remove the bolts and drive chain adjuster.



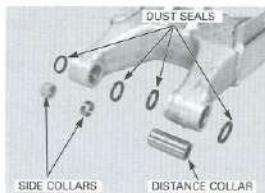
Remove the bolts and drive chain slider.

Check the drive chain slider for wear or damage.



Remove the pivot collar and dust seals from the swingarm left pivot.

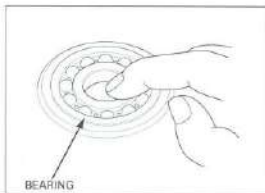
Check the dust seals and collars for damage or fatigue.



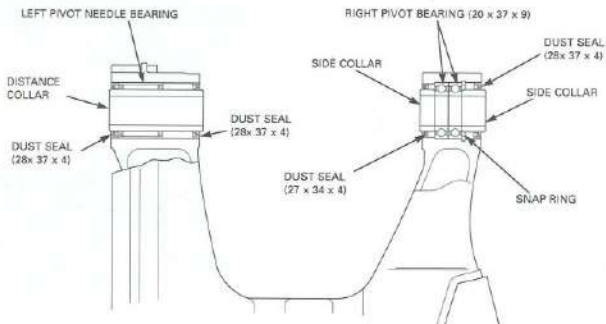
Turn the inner race of right pivot bearings with your finger.

The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the pivot.



### PIVOT BEARING REPLACEMENT



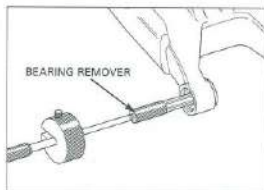
Remove the snap ring.



Remove the right pivot radial ball bearing using the special tools.

#### TOOLS:

Bearing remover handle	07936-3710100
Bearing remover shaft set, 20mm	07936-3710600
Remover weight	07741-0010201

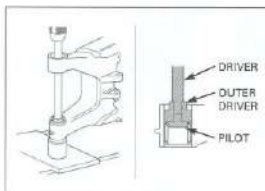


Press the left pivot needle bearing out using the special tools and a hydraulic press.

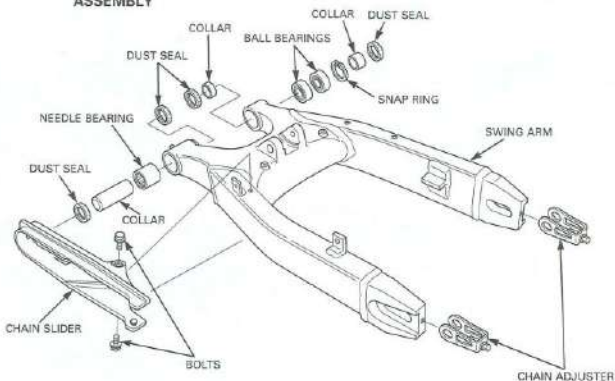
## TOOLS:

Driver  
Attachment, 32 X 35 mm  
Pilot, 28 mm

07949-3710001  
07746-0010001  
07746-0041100



## ASSEMBLY



Press the needle bearing into the pivot with the marked side facing out.

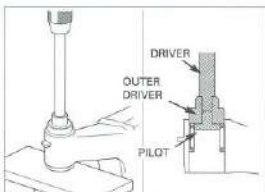
Pack the new needle bearing with grease.

Press the needle bearing into the swingarm left pivot until it seats using the special tools and a hydraulic press.

## TOOLS:

Driver  
Attachment, 37 mm  
Pilot, 28 mm

07749-0010000  
07ZMD-MBW0200  
07746-0041100



## REAR WHEEL/SUSPENSION

Press the radial ball bearing in using the special tools and a hydraulic press.

### TOOLS:

Driver

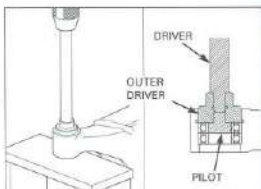
07749-0010000

Attachment, 32 X 35 mm

07746-0010100

Pilot, 20 mm

07746-0040500



Install the snap ring into the groove securely.

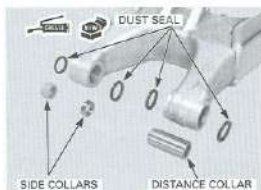


Apply grease to the dust seal lips, then install the dust seals into the left swingarm pivot.

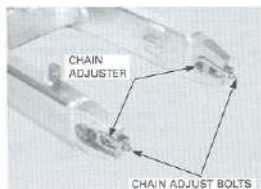
Fill the grease up between the inner dust seal and needle bearing.

Install the pivot distance collar.

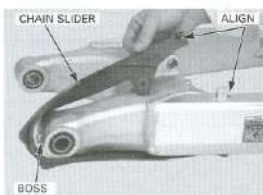
Apply grease to the dust seal lips, then install the dust seals and pivot collar into the right swingarm pivot.



Install the bolts and drive chain adjusters.

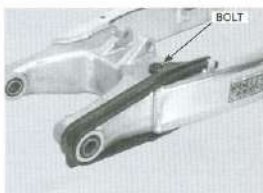


Install the drive chain slider, aligning the slit with the boss on the swingarm. Install the drive chain slider bosses into the hole in the swingarm.



Install and tighten the new drive chain slider mounting bolts to the specified torque.

**TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)**



## INSTALLATION

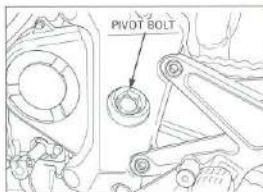
Apply a thin coat of grease to the swingarm pivot bolt sliding surface.

Install the swingarm onto the frame.

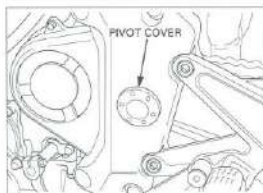
Install the swingarm pivot bolt to the frame and swingarm pivot.

Install and tighten the swingarm pivot nut to the specified torque.

**TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)**



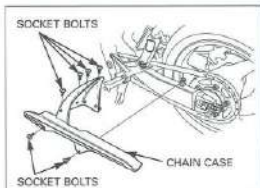
Install the pivot bolt collar.



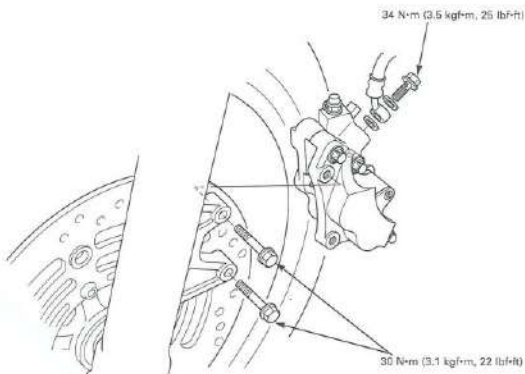
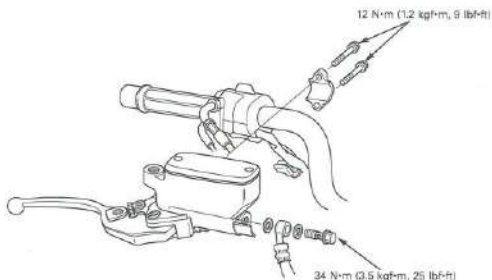
## REAR WHEEL/SUSPENSION

Install the socket bolts and drive chain case.

Install the rear wheel (page 14-9).



## FRONT:

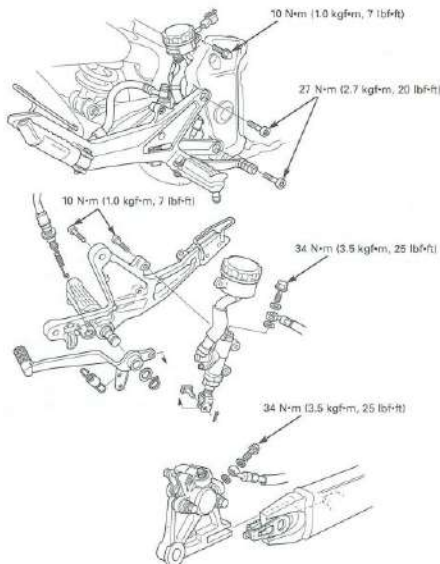




# 15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-2	FRONT MASTER CYLINDER	15-10
TROUBLESHOOTING	15-3	REAR MASTER CYLINDER	15-15
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-4	FRONT BRAKE CALIPER	15-19
BRAKE PAD/DISC	15-7	REAR BRAKE CALIPER	15-23
		BRAKE PEDAL	15-26

## REAR:



## SERVICE INFORMATION

## GENERAL

**⚠ CAUTION**

Frequent inhalation of brake pad dust, regardless of material composition could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner.
- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the brake lever or pedal after the air bleeding.
- Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the motorcycle.

## SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DOT 4	—
	Brake disc thickness	4.3 – 4.7 (0.17 – 0.19)	3.5 (0.14)
	Brake disc runout	—	0.3 (0.012)
	Master cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Master piston O.D.	13.957 – 13.984 (0.5495 – 0.5508)	13.945 (0.5490)
	Caliper cylinder I.D.	A	30.230 – 30.280 (1.1902 – 1.1921)
		B	27.000 – 27.050 (1.0630 – 1.0650)
	Caliper piston O.D.	A	30.148 – 30.198 (1.1869 – 1.1889)
		B	26.918 – 26.968 (1.0598 – 1.0617)
Rear	Specified brake fluid	DOT 4	—
	Brake disc thickness	4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
	Brake disc runout	—	0.30 (0.012)
	Master cylinder I.D.	12.700 – 12.743 (0.49999 – 0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	38.180 – 38.230 (1.053 – 1.505)	38.24 (1.506)
	Caliper piston O.D.	38.098 – 38.148 (1.4999 – 1.5019)	38.09 (1.500)

## TORQUE VALUES

Front master cylinder reservoir cap screw  
 Brake lever pivot bolt  
 Brake lever pivot nut  
 Front brake light switch screw  
 Front master cylinder mounting bolt  
 Front brake caliper assembly torx bolt  
 Front brake caliper mounting flange bolt  
 Rear master cylinder joint nut  
 Rear master cylinder mounting bolt  
 Rear brake caliper bolt  
 Rear brake caliper pin bolt  
 Pad pin  
 Pad pin plug  
 Brake hose oil bolt  
 Brake caliper bleeder valve  
 Footpeg bracket mounting bolt  
 Rear master cylinder hose joint screw

1 N·m (0.1 kgf·m, 0.7 lbf·ft)  
 1 N·m (0.1 kgf·m, 0.7 lbf·ft)  
 6 N·m (0.6 kgf·m, 4.3 lbf·ft)  
 1 N·m (0.1 kgf·m, 0.7 lbf·ft)  
 12 N·m (1.2 kgf·m, 9 lbf·ft)  
 32 N·m (3.3 kgf·m, 24 lbf·ft)  
 30 N·m (3.1 kgf·m, 22 lbf·ft)  
 17 N·m (1.7 kgf·m, 12 lbf·ft)  
 10 N·m (1.0 kgf·m, 7 lbf·ft)  
 23 N·m (2.3 kgf·m, 17 lbf·ft)  
 27 N·m (2.8 kgf·m, 20 lbf·ft)  
 17 N·m (1.7 kgf·m, 12 lbf·ft)  
 3 N·m (0.3 kgf·m, 2.2 lbf·ft)  
 34 N·m (3.5 kgf·m, 25 lbf·ft)  
 6 N·m (0.6 kgf·m, 4.3 lbf·ft)  
 27 N·m (2.7 kgf·m, 2.0 lbf·ft)  
 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

Apply a locking agent to the threads  
 ALOC bolt

## TOOL

Snap ring pliers

07914-SA50001

## TROUBLESHOOTING

**Brake lever/pedal soft or spongy**

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly (rear)
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

**Brake lever/pedal hard**

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly (rear)
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

**Brake drags**

- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly (rear)
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

## BRAKE FLUID REPLACEMENT/AIR BLEEDING

### NOTICE

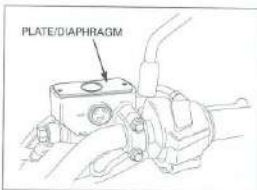
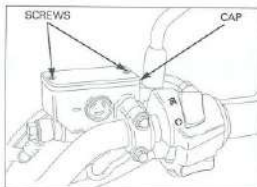
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

### BRAKE FLUID DRAINING

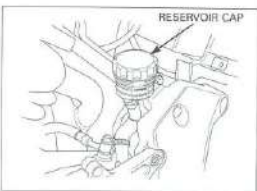
For the front brake, turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws and reservoir cap.

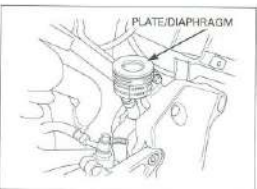
Remove the diaphragm plate and diaphragm.



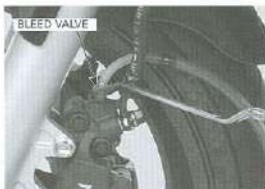
Remove the reservoir cap.



Remove the diaphragm plate and diaphragm.



Connect a bleed hose to the caliper bleed valve.



Loosen the bleed valve and pump the brake lever or pedal.

Stop pumping the lever or pedal when no more fluid flows out of the bleed valve.



## BRAKE FLUID FILLING/BLEEDING

Close the bleed valve.

Fill the reservoir with DOT 4 brake fluid from a sealed container.

### NOTE:

- Use only DOT 4 brake fluid from a sealed container.
- Do not mix different types of fluid. They are not compatible.

*Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.*

*If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.*

Connect a commercially available brake bleeder to the bleed valve.

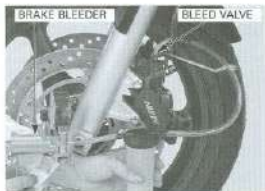
Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat the previous step procedures until air bubbles do not appear in the plastic hose.

Close the bleed valve and operate the brake lever or pedal.

If it still feels spongy, bleed the system again.



## HYDRAULIC BRAKE

If a brake bleeder is not available, use the following procedure.

Pump up the system pressure with the lever or pedal until lever or pedal resistance is felt.

Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the brake lever or depress the brake pedal, open the bleed valve 1/2 turn and then close it.
2. Release the brake lever or pedal until the bleed valve has been closed.

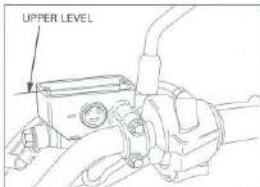
*Do not release the brake lever or pedal until the bleed valve has been closed.*

Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleed valve.

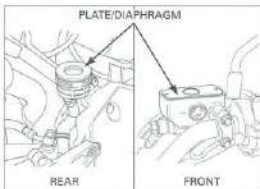
Tighten the bleed valve.

**TORQUE: 8 N·m (0.8 kgf·m, 4.3 lbf·ft)**

Fill the fluid reservoir to the upper level.



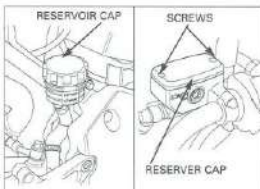
Reinstall the diaphragm and diaphragm plate.



On the front brake, install the reservoir cap, and tighten the screws to the specified torque.

**TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)**

On the rear brake, install the reservoir cap securely,



## BRAKE PAD/DISC

### FRONT BRAKE PAD REPLACEMENT

Remove the pad pin plug.



Loosen the pad pins.

Remove the bolts and brake caliper. Push the caliper pistons all the way in to allow installation of new brake pads.

Remove the pad pin and pad spring.



Remove the brake pads.



Install the new brake pads.

Install the pad spring with its arrow mark facing up as shown.



Push the pad spring, then install the pad pin.

Tighten the pad pin.

**TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)**



Install and tighten the pad pin plug.

**TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)**



*Always replace the brake pads in pairs to assure even disc pressure.*

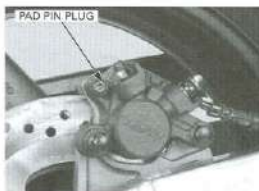
*Check the brake fluid level in the brake master cylinder reservoir as the operation causes the level to rise.*

### REAR BRAKE PAD REPLACEMENT

Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.

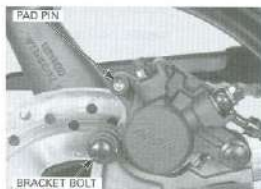


Remove the pad pin plug.

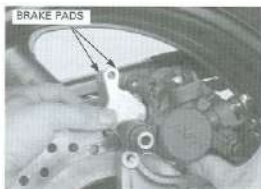




Remove the pad pin.  
Remove the caliper bracket bolt.



Pivot the caliper up.  
Remove the pad pin and brake pads.



Install the new brake pads.

*Make sure the  
brake pad spring  
is in place.*

Lower the caliper while pushing the pads against the pad spring so that the pad ends are positioned onto the retainers on the caliper bracket.



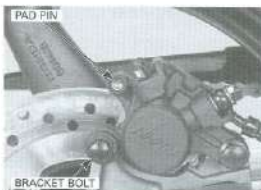
Install the pad pin.

Install and tighten the caliper bracket bolt.

**TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)**

Tighten the pad pin.

**TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)**



## HYDRAULIC BRAKE

Install and tighten the pad pin plug.

**TORQUE:** 3 N·m (0.3 kgf·m, 2.2 lbf·ft)



### BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

Measure the brake disc thickness with a micrometer.

#### SERVICE LIMITS:

**FRONT:** 3.5 mm (0.14 in)

**REAR:** 4.0 mm (0.16 in)

Replace the brake disc if the smallest measurement is less than the service limit.



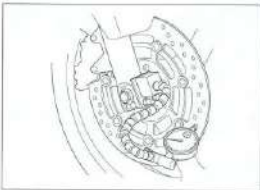
Measure the brake disc warpage with a dial indicator.

#### SERVICE LIMITS:

**FRONT:** 0.30 mm (0.012 in)

**REAR:** 0.30 mm (0.012 in)

Check the wheel bearings for excessive play. If the warpage exceeds the service limit, replace the brake disc if the wheel bearings are normal.



## FRONT MASTER CYLINDER

### REMOVAL

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

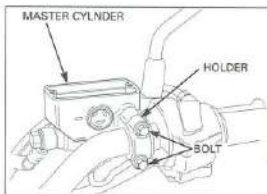
Drain the front hydraulic system (page 15-4).

Disconnect the brake light switch wire connectors.

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

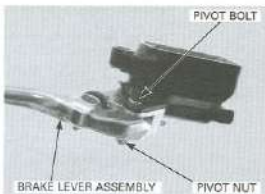


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



### DISASSEMBLY

Remove the pivot bolt/nut and brake lever assembly.



Remove the screw and brake light switch.



Remove the boot.



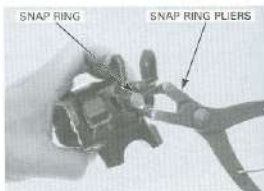
## HYDRAULIC BRAKE

Remove the snap ring from the master cylinder body using the special tool as shown.

### TOOL:

Snap ring pliers

07914-SA50001



Remove the master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.



### INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for abnormal scratches.

Measure the master cylinder I.D.

**SERVICE LIMIT: 14.055 mm (0.5533 in)**

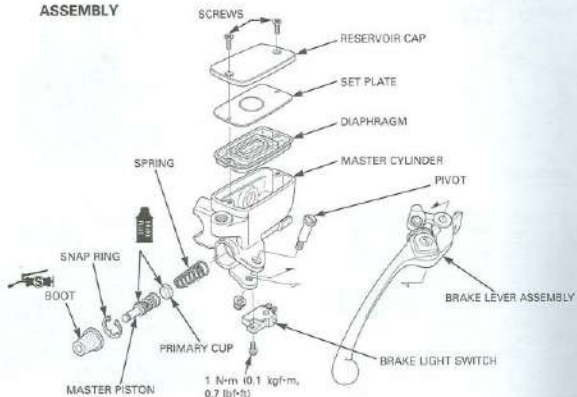


Measure the master cylinder piston O.D.

**SERVICE LIMIT: 13.945 mm (0.5490 in)**



## ASSEMBLY



Keep the piston, cups, spring, snap ring and boot in a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.

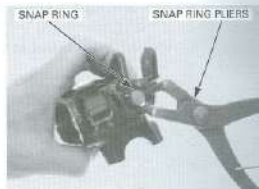
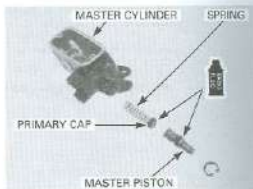
When installing the cups, do not allow the lip to turn inside out.

Dip the piston in brake fluid. Install the spring into the piston. Install the piston assembly into the master cylinder.

Install the snap ring.

**TOOL:**  
Snap ring pliers

07914-SA50001



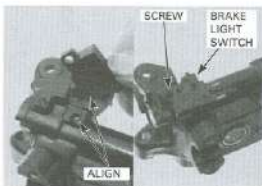
## HYDRAULIC BRAKE

Apply silicon grease to the boot inside.  
Install the boot.



Install the brake light switch and tighten the screw to the specified torque.

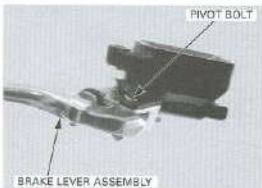
**TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)**



Apply silicone grease to the contact surfaces of the brake lever and piston tip.

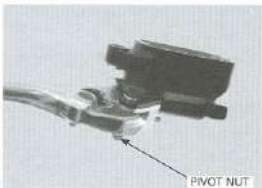
Install the brake lever assembly, tighten the pivot bolt to the specified torque.

**TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)**



Hold the pivot bolt and tighten the pivot nut to the specified torque.

**TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)**

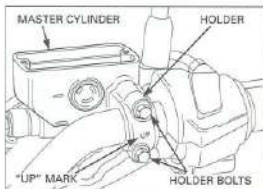


Place the master cylinder assembly on the handlebar. Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.

Tighten the upper bolt first, then the lower bolt to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**



Install the brake hose eyelet with the oil bolt and new sealing washers.

Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Connect the brake light switch wire connectors.

Fill the reservoir to the upper level and bleed the brake system (page 15-4).

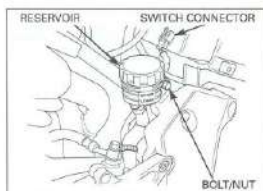


## REAR MASTER CYLINDER

### REMOVAL

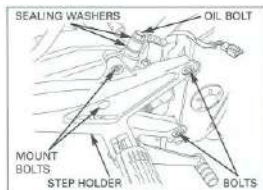
Drain the rear hydraulic system (page 15-4).

Disconnect the brake light switch 2P connector. Remove the rear master cylinder reservoir mounting bolt/nut.



Remove the brake hose oil bolt, sealing washers and brake hose.

Loosen the rear master cylinder mounting bolts. Remove the socket bolts and footpeg bracket assembly.

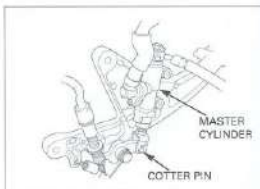


*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

## HYDRAULIC BRAKE

Remove and discard the brake pedal joint cotter pin. Remove the joint pin.

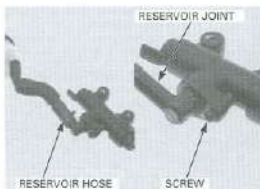
Remove the master cylinder mounting bolts, step guard and master cylinder.



### DISASSEMBLY

Disconnect the reservoir hose from the reservoir hose joint.

Remove the screw and reservoir hose joint from the master cylinder.



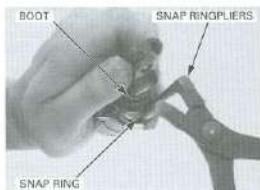
Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

#### TOOL:

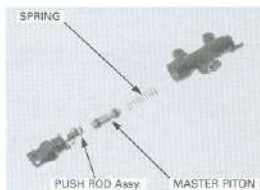
Snap ring pliers

07914-SA50001



Remove the push rod, master piston, primary cup and spring.

Clean the inside of the cylinder with brake fluid.





## INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.

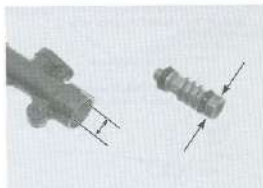
Check the master cylinder and piston for abnormal scratches.

Measure the master cylinder I.D.

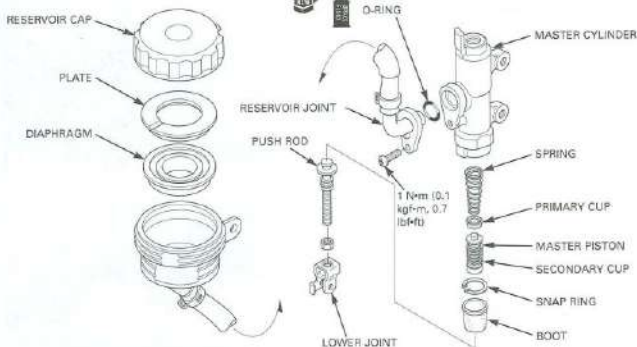
**SERVICE LIMIT: 12.755 mm (0.5022 in)**

Measure the master cylinder piston O.D.

**SERVICE LIMIT: 12.648 mm (0.4978 in)**



## ASSEMBLY

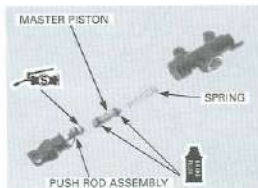


Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.

When installing the cups, do not allow the lips to turn inside out.

Dip the piston in brake fluid. Install the spring to the primary cup. Install the spring/primary cup and master piston assembly. Apply silicone grease to the piston contact area of the push rod.



## HYDRAULIC BRAKE

Be certain the snap ring is firmly seated in the groove.

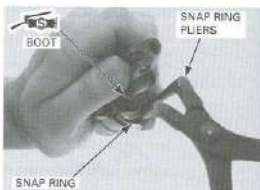
Install the push rod into the master cylinder.  
Install the snap ring.

### TOOL:

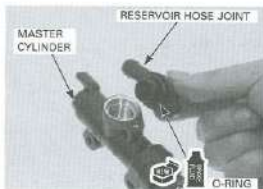
Snap ring pliers

07914-6A50001

Apply silicone grease to the boot inside.  
Install the boot.

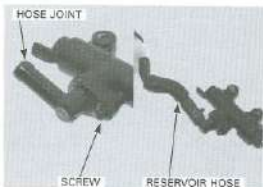


Apply brake fluid to a new O-ring and install it onto the reservoir joint.  
Install the reservoir joint into the master cylinder.



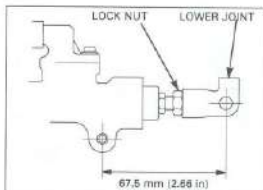
Install and tighten the screw securely.

Connect the reservoir hose to the reservoir joint.



If the push rod is disassembled, adjust the push rod length as shown.  
After adjustment, tighten the lock nut to the specified torque.

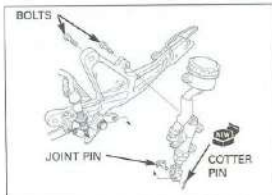
**TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)**



## INSTALLATION

Place the master cylinder onto the main footpeg bracket, install the master cylinder mounting bolts.

Connect the brake pedal to the push rod lower joint. Install the joint pin and secure it with a new cotter pin.



Install the driver footpeg bracket onto the frame, tighten the socket bolts to the specified torque.

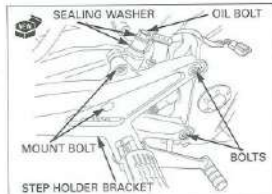
**TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)**

Tighten the master cylinder mounting bolts to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Install the brake hose with the oil bolt and new sealing washers.

Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

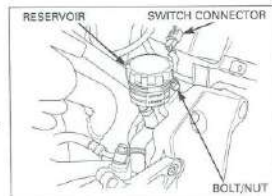


**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Install and tighten the brake reservoir mounting bolt/nut to the specified torque.

**TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)**

Connect the brake light switch 2P (Black) connector.



Fill the reservoir to the upper level and bleed the brake system (page 15-4).

## FRONT BRAKE CALIPER

### REMOVAL

Drain the front brake hydraulic system (page 15-4).

Remove the oil bolt, sealing washers and brake hose eyelet joint.

Remove the caliper mounting bolts and caliper. Remove the brake pads (page 15-7).

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*



### DISASSEMBLY

Install corrugated cardboard or soft wood sheet between the pistons.

Do not use high pressure air or bring the nozzle too close to the inlet. Apply small squirts of air pressure to the fluid inlet to remove the pistons.



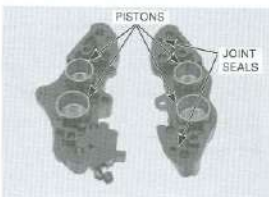
Remove the four caliper assembly bolts and separate the caliper halves.



Mark the pistons to ensure correct reassembly.

Remove the following:

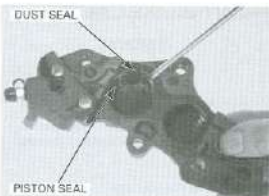
- Joint seals
- Caliper piston A
- Caliper piston B



Be careful not to damage the piston sliding surface.

Push the dust seals and piston seals in and lift them out.

Clean the seal grooves with clean brake fluid.



## INSPECTION

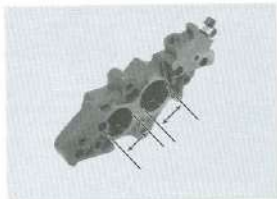
Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

## SERVICE LIMITS:

A: 30.29 mm (1.192 in)

B: 27.060 mm (1.065 in)



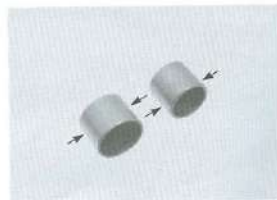
Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.

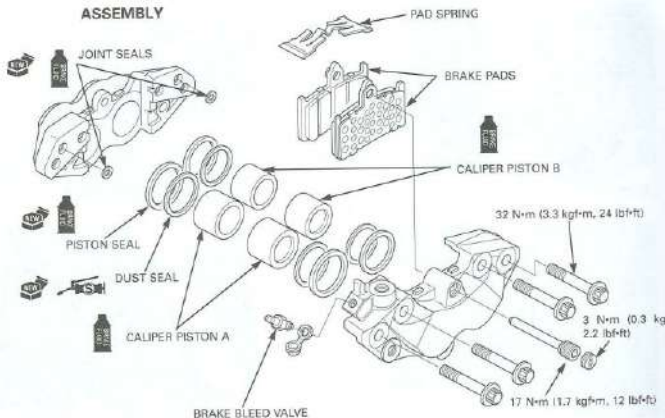
## SERVICE LIMITS:

A: 30.14 mm (1.187 in)

B: 26.91 mm (1.059 in)



## ASSEMBLY

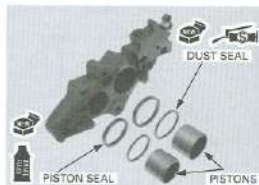


## HYDRAULIC BRAKE

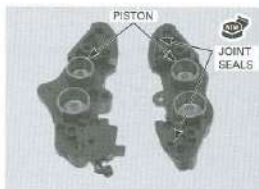
Coat the new piston seals with clean brake fluid.  
Coat the new dust seals with silicone grease.

Install the piston and dust seal into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



Install the new joint seals into the fluid passages on the caliper.

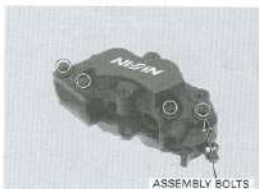


Assemble the caliper halves.

Apply a locking agent to the caliper assembly bolt threads.

Install and tighten the caliper assembly bolts to the specified torque.

**TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)**



## INSTALLATION

Install the brake pads (page 15-6).

Install the brake caliper onto the fork leg.

Install and tighten the new caliper mounting bolts to the specified torque.

**TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)**

Install the brake hose eyelet to the caliper body with two new sealing washers and the oil bolt.



Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

**TORQUE:** 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the front brake hydraulic system (page 15-4).



## REAR BRAKE CALIPER

### REMOVAL

Drain the rear brake hydraulic system (page 15-5).

Loosen the caliper bracket bolt.

Remove the rear wheel (page 14-3).

Remove the oil bolt, sealing washers and brake hose eyelet joint.

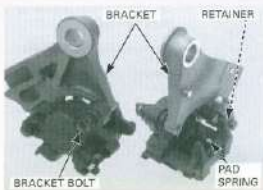


### DISASSEMBLY

Remove the caliper bracket bolt and the brake pads (page 15-8).

Remove the pad spring, collar and boot from the caliper body.

Remove the caliper body from the caliper bracket. Remove the retainer from the caliper bracket.



*Do not use high pressure air or bring the nozzle too close to the inlet.*

Place a shop towel over the piston.

Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.

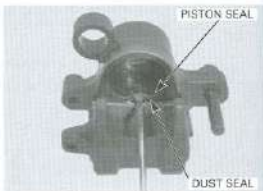


## HYDRAULIC BRAKE

*Be careful not to damage the piston sliding surface*

Push the dust seal and piston seal in and lift them out.

Clean the seal grooves with clean brake fluid.



### INSPECTION

Check the caliper cylinder for scoring or other damage.

Measure the caliper cylinder I.D.

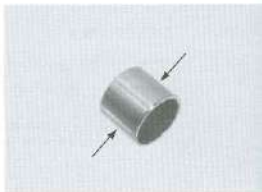
**SERVICE LIMIT: 38.24 mm (1.506 in)**



Check the caliper pistons for scratches, scoring or other damage.

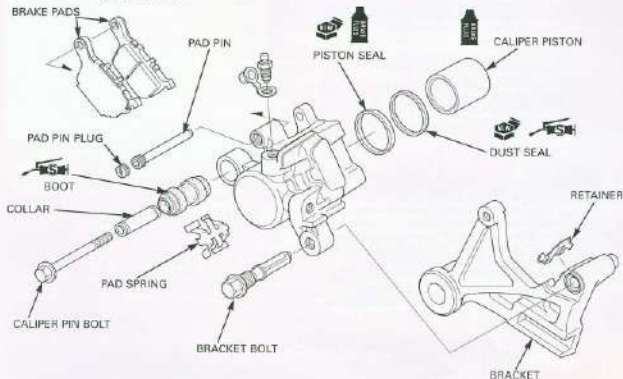
Measure the caliper piston O.D.

**SERVICE LIMIT: 38.09 mm (1.500 in)**





## ASSEMBLY



Coat the new piston seal with clean brake fluid.  
Coat the new dust seal with silicone grease.

Install the piston seal and dust seal into the groove of the caliper body.

Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with its opening end toward the pad.

If the caliper and bracket pin boots are hard or deteriorated, replace them with new ones.

Apply silicone grease to the inside of the bracket pin boot.

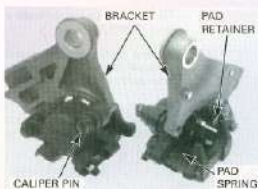
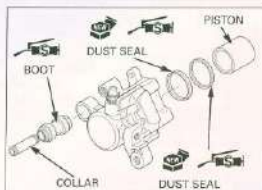
Install the bracket pin boot and collar into the caliper.

Install the pad retainer into the bracket.

Apply silicone grease to the caliper pin and install the caliper body to the bracket.

Install the pad spring into the caliper bracket.

Install the caliper bracket bolt and brake pads (page 15-8).



## HYDRAULIC BRAKE

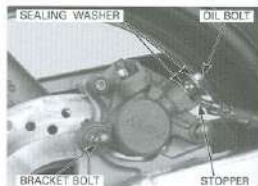
### INSTALLATION

Install the wheel (page 14-9).

Install the brake caliper/bracket assembly onto the guide of the swingarm (page 14-10).

Install and tighten the caliper bracket bolt to the specified torque.

**TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)**



Install the brake hose eyelet to the caliper body with two new sealing washers and oil bolt.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

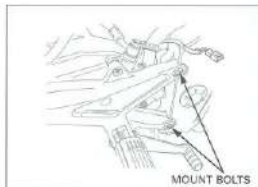
**TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)**

Fill and bleed the rear brake hydraulic system (page 15-4).

## BRAKE PEDAL

### REMOVAL

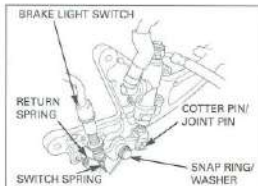
Remove the footpeg bracket mounting bolts and bracket assembly from the frame.



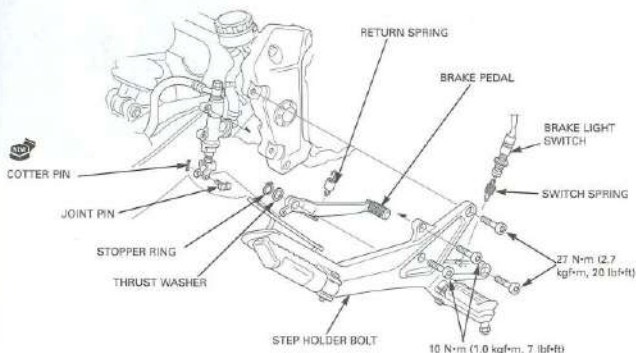
Remove and discard the brake pedal joint cotter pin. Remove the joint pin.

Unhook the return spring and remove the brake light switch from the stop holder. Unhook the brake pedal return spring.

Remove the snap ring and thrust washer. Remove the brake pedal from the pivot.



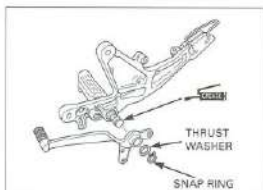
## INSTALLATION



Apply grease to the sliding surface of the brake pedal and footpeg.

Install the brake pedal and thrust washer to the pedal pivot.

Secure the pedal pivot with a snap ring.

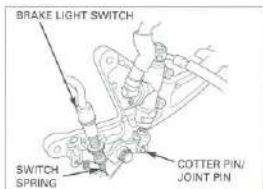


Hook the brake pedal return spring.

Install the brake light switch and hook the switch spring.

Connect the brake pedal to the push rod lower joint. Install the joint pin and secure it with a new cotter pin.

Install the right driver footpeg bracket assembly onto the frame.

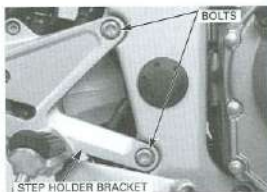


## HYDRAULIC BRAKE

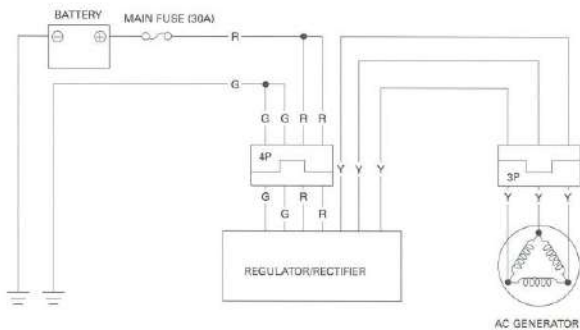
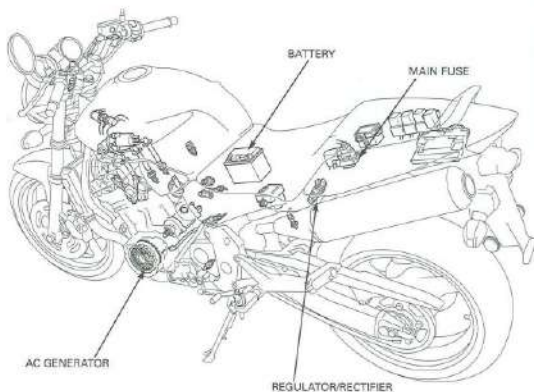
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Install and tighten the right footpeg bracket socket bolts to the specified torque.

**TORQUE:** 27 N·m (2.8 kgf·m, 20 lbf·ft)



# SYSTEM DIAGRAM



# 16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	16-0	CHARGING SYSTEM INSPECTION	16-8
SERVICE INFORMATION	16-1	ALTERNATOR CHARGING COIL	16-9
TROUBLESHOOTING	16-3	REGULATOR/RECTIFIER	16-9
BATTERY	16-5		

## SERVICE INFORMATION

### GENERAL

#### WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
  - If swallowed, drink large quantities of water or milk and call your local Poison Control Center or a call a physician immediately.
- Always turn off the ignition switch before disconnecting any electrical component.
- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The maintenance free battery must be replaced when it reaches the end of its service life.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for a long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).
- For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.

**16**

### BATTERY TESTING

Refer to the instruction of the Operation Manual for the recommended battery tester. The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

Recommended battery tester    **BM-210-AH or BM-210**

## BATTERY/CHARGING SYSTEM

### SPECIFICATIONS

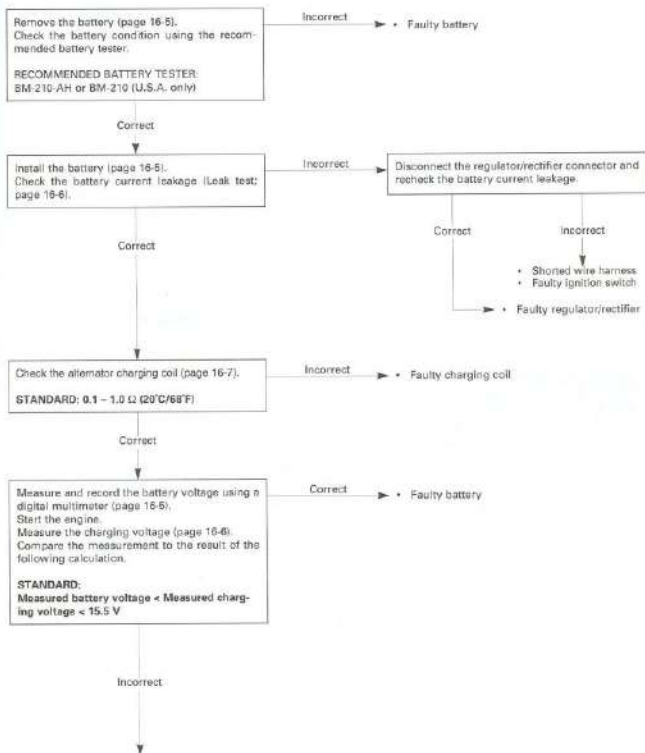
ITEM			SPECIFICATIONS
Battery	Capacity		12V - 8.6 Ah
	Current leakage		1.2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 - 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5 - 10 h
		Quick	5.0 A/0.5 h
Alternator	Capacity		0.38 kW/5,000 min <sup>-1</sup> (rpm)
	Charging coil resistance (20°C/68°F)		0.1 - 1.0 Ω

### TOOLS

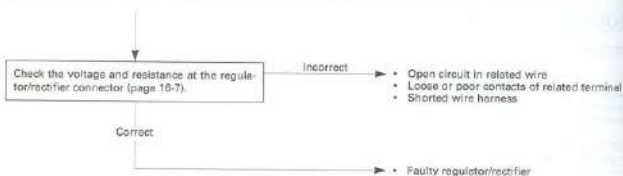
Digital multimeter	Commercially available	or available through American Honda Tool and Equipment Program
Battery tester	BM-210-AH	available through American Honda Tool and Equipment Program or BM210
Christy battery charger	MC1012/2	available through American Honda Tool and Equipment Program

## TROUBLESHOOTING

## BATTERY IS DAMAGED OR WEAK







## BATTERY

## REMOVAL/INSTALLATION

*Always turn the ignition switch OFF before removing the battery.*

Remove the side cover (page 2-2).

Disconnect the battery band and pull out the battery from the battery case.

Disconnect the negative cable and then the positive cable, and remove the battery.

Install the battery in the reverse order of removal. After installing the battery, coat the terminals with clean grease.

Install the side cover (page 2-2).

*Connect the positive terminal first and then the negative cable.*

## VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

## VOLTAGE:

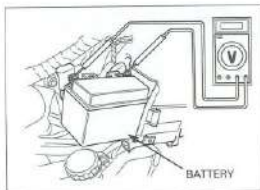
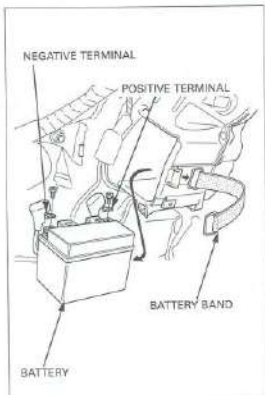
Fully charged: 13.0 – 13.2V

Under charged: Below 12.3V

## TOOL:

Digital multimeter

Commercially available or available through American Honda Tool and Equipment Program



## BATTERY/CHARGING SYSTEM

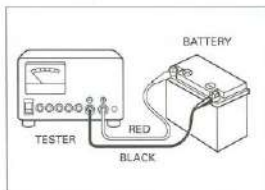
### BATTERY TESTING

Remove the battery (page 17-4).

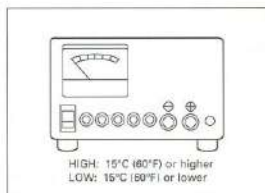
*For accurate test results, be sure the tester's cables and clamps are in good working condition and that a secure connection can be made at the battery.*

**TOOL:**  
Battery tester

BM-210-AH  
or BM-210(U.S.A. only)



Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.



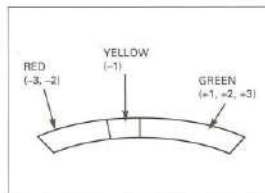
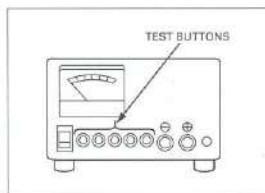
*For the first check, DO NOT charge the battery before testing; test it in an "as is" condition.*

Push in the appropriate test button for 3 seconds and read the condition of the battery on the meter.

### NOTICE

- To avoid damaging the tester, only test batteries with an ampere rating of less than 30 Ah.
- Tester damage can result from overheating when:
  - The test button is pushed in for more than 3 seconds.
  - The tester is used without being allowed to cool for at least 1 minute when testing more than one battery.
  - More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.

The result of a test on the meter scale is relative to the amp. hour rating of the battery. Any battery reading in the green zone is OK. Batteries should only be charged if they register in the YELLOW or RED zone.



## BATTERY CHARGING

Remove the battery (page 17-4).

**NOTICE**

- Make sure the area around the charger is well ventilated, clear of flammable materials, and free from heat, humidity, water and dust.
- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger – gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

1. Turn the "POWER" switch to "OFF".
2. Set the "BATTERY AMP. HR. SELECTOR SWITCH" for the size of the battery being charged.

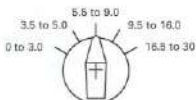
**TOOL:**

Christie battery charger

MC1012/2  
(U.S.A. only)

Turn the power ON/OFF at the charger, not at the battery terminals.

BATTERY AMP. HR.  
SELECTOR SWITCH

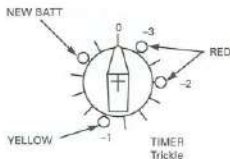


Set the appropriate amp. hour rating.

3. Set the "TIMER" to the position indicated by the Honda Battery Tester; RED-3, RED-2 or YELLOW 1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals: red to positive, black to negative.

Connect the battery cables only when the "POWER" switch is turned to "OFF".

Connecting the cables with the POWER switch turned to "ON" can produce a spark which could ignite or explode the battery.



5. Turn the "POWER" switch to "ON".
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the "POWER" switch to "OFF" and disconnect the clamps.
7. Let the battery cool for at least 10 minutes or until gassing subsides after charging.
8. Retest the battery using the Honda battery tester and recharge if necessary using the above steps.

The charger will automatically switch to the "Trickle" mode after the set charging time has elapsed.

### CHARGING SYSTEM INSPECTION

#### CURRENT LEAKAGE INSPECTION

*Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch.*

*Failure to follow this precaution can damage the tester or electrical components.*

Remove the battery (page 15-5).

Turn the ignition switch off and disconnect the negative battery cable from the battery.

Connect the ammeter (+) probe to the ground cable and the ammeter (-) probe to the battery (-) terminal. With the ignition switch off, check for current leakage.

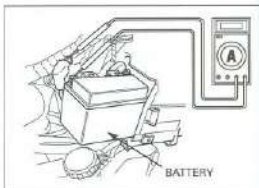
#### NOTICE

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

**SPECIFIED CURRENT LEAKAGE:** 1.2 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.



#### CHARGING VOLTAGE INSPECTION

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.

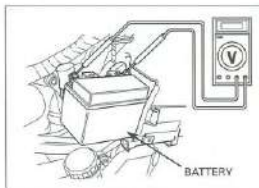
Stop the engine, and connect the multimeter as shown.

To prevent a short, make absolutely certain which are the positive and negative terminals or cable.

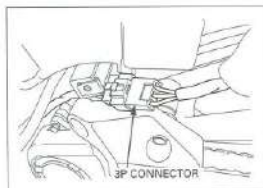
Restart the engine.

With the headlight on Hi beam, measure the voltage on the multimeter when the engine runs at 5,000 rpm.

**Standard:** Measured battery voltage (page 16-5) < Measured charging voltage (see above) < 15.5 V at 5,000 rpm



*It is not necessary  
to remove the  
stator coil to  
make this test.*



## ALTERNATOR CHARGING COIL

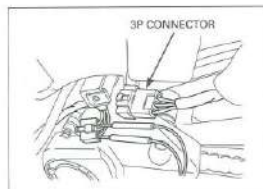
### INSPECTION

Remove the left side cowl (page 2-4).

Disconnect the alternator 3P connector.

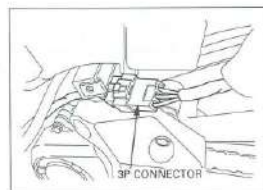
Check the resistance between all three Yellow terminals.

**STANDARD:** 0.1 – 1.0  $\Omega$  (at 20°C/68°F)



Check for continuity between all three Yellow terminals and Ground. There should be no continuity.

If readings are far beyond the standard, or if any wire has continuity to ground, replace the alternator stator. Refer to section 10 for stator removal.



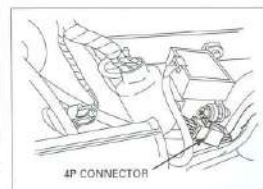
## REGULATOR/RECTIFIER

### SYSTEM INSPECTION

Remove the rear cowl (page 2-3).

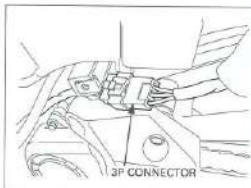
Item	Terminal	Specification
Battery charging line	Red/White (+) and ground (-)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.1 – 1.0 $\Omega$ (at 20°C/68°F)
Ground line	Green and ground	Continuity should exist

Disconnect the regulator/rectifier 3P, 4P connectors, and check it for loose contact or corroded terminals.



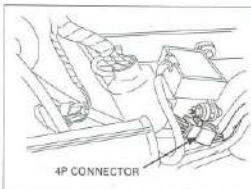
## BATTERY/CHARGING SYSTEM

If the regulated voltage reading (see page 16-6) is out of the specification, measure the voltage between connector terminals (wire harness side) as follows:  
If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.



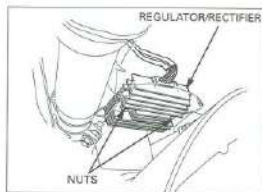
### REMOVAL/INSTALLATION

Disconnect the alternator 3P (White) connector.



Disconnect the alternator 4P (White) connector.  
Remove the two nuts and regulator/rectifier.

Installation is in the reverse order of removal.



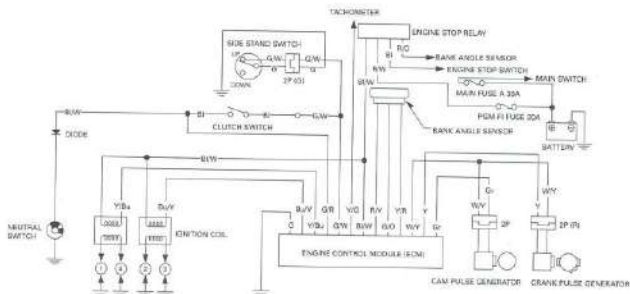
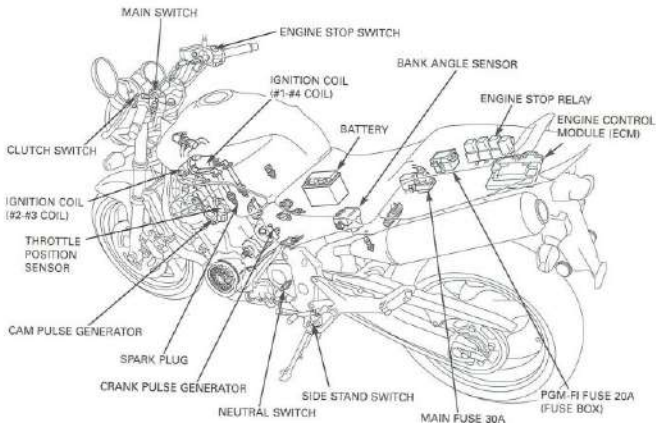
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MEMO

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## SYSTEM DIAGRAM



# 17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION COIL	17-7
SERVICE INFORMATION	17-1	IGNITION PULSE GENERATOR	17-7
TROUBLESHOOTING	17-3	IGNITION TIMING	17-10
IGNITION SYSTEM INSPECTION	17-4	ECM (ENGINE CONTROL MODULE)	17-11

## SERVICE INFORMATION

### GENERAL

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 17-3.
- This motorcycle's Ignition Control Module (ICM) is built into the Engine Control Module (ECM).
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- The ECM may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- Refer to section 5 for Throttle Position (TP) sensor, cam pulse generator and ECM inspection.

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug (Iridium)	NGK	CR8EH-9 (Standard) / CR8EH-9 (For extended high speed running)
	DENSO	U24FER9 (Standard) / U27FER9 (For extended high speed running)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("R" mark)		8° BTDC at idle

## IGNITION SYSTEM

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### TORQUE VALUES

Timing hole cap	18 N•m (1.8 kgf•m, 13 lbf•ft)	Apply grease to the threads
Spark plug	12 N•m (1.2 kgf•m, 9 lbf•ft)	
Ignition pulse generator cover	10 N•m (1.0 kgf•m, 7 lbf•ft)	Apply sealant to the threads
Ignition pulse generator rotor special bolt	59 N•m (6.0 kgf•m, 43 lbf•ft)	

### TOOLS

Peak voltage tester (U.S.A. only)	
Peak voltage adaptor	07HGJ-0020100 (not available in U.S.A.) with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

## TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water in the direct ignition coil (leaking ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the Ignition coil with a known-good one and perform the spark test.
- If there is spark, the exchanged Ignition coil is faulty.
- "Initial voltage" of the Ignition primary coil is the battery voltage with the ignition switch ON and engine stop switch at RUN (The engine is not cranked by the starter motor).

	Unusual condition	Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches ON. (Other electrical components are normal)	1. Faulty engine stop switch. 2. An open circuit in Black/white wire between the ignition coil and engine stop switch. 3. Loose or poor connect of the ignition coil primary wire terminal, or an open circuit in primary coil (Check at the ECM connector). 4. Faulty ECM (when the initial voltage is normal while disconnecting ECM connector)
	Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage between the Black/white (+) and Body ground (–) at the ECM multi-connector or loose ECM connection. 4. An open circuit or loose connection in Green wire. 5. An open circuit or loose connection in Blue/black and Yellow/blue wires between the ignition coils and ECM. 6. Short circuit in ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. An open circuit or loose connection in No.7 related circuit wires. • Side stand switch line: Green/white wire • Neutral switch line: Light green wire 9. Faulty ignition pulse generator (measure the peak voltage). 10. Faulty ECM (in case when above No. 1 – 9 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	1. Faulty peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ECM (in case when above No.1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery under-charged). 3. The sampling timing of the tester and measured pulse were not synchronised (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ECM (in case when above No. 1 – 3 are normal).
	Initial and peak voltage are normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil (sl).
Ignition pulse generator	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery under charged). 3. The sampling timing of the tester and measured pulse were not synchronised (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ECM (when above No. 1 – 3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

### IGNITION SYSTEM INSPECTION

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use a recommended digital multimeter or commercially available digital multimeter with an impedance of 10 M $\Omega$ /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If the Imrie diagnostic tester (model 625) is used, follow the manufacturer's instruction.

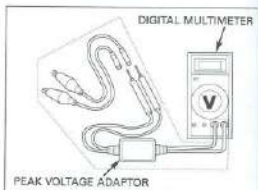
Connect the peak voltage tester or peak voltage adaptor to the digital multimeter.

#### TOOLS:

Peak voltage tester (U.S.A. only)

Peak voltage adaptor 07HGJ-0020100  
(not available in U.S.A.)

with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)



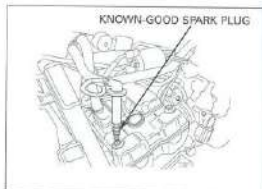
### IGNITION COIL PRIMARY PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Open and support the front end of the fuel tank (page 3-4).

Shift the transmission into neutral and disconnect all the spark plug caps from the spark plug.

Connect known good spark plugs to the spark plug caps and ground the spark plugs to the cylinder head as done in a spark test.



With the ignition coil primary wire connected, connect the peak voltage adaptor or imrie tester to the ignition coil.

**CONNECTION:**

**No.1/NO.4 coil:**

Yellow/Blue terminal (+) – Body ground (–)

**No.2/NO.3 coil:**

Blue/Yellow terminal (+) – Body ground (–)

Turn the ignition switch "ON" and engine stop switch to "RUN".

Check for initial voltage at this time.

The battery voltage should be measured.

If the initial voltage cannot be measured, check the power supply circuit (refer to Troubleshooting, page 17-3).

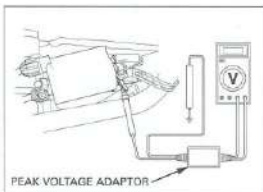
Shift the transmission into neutral.

Crank the engine with the starter motor and read ignition coil primary peak voltage.

**PEAK VOLTAGE: 100V minimum**

If the peak voltage is abnormal, check for an open circuit or poor connection in Yellow/blue and Blue/yellow wires.

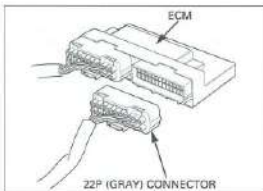
If no defects are found in the harness, refer to the troubleshooting chart on page 17-3.



## IGNITION PULSE GENERATOR PEAK VOLTAGE

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Disconnect the 22P (Gray) connector from the ECM (page 5-76).



*Avoid touching the spark plugs and tester probes to prevent electric shock.*

Connect the peak voltage tester or peak voltage adaptor probes to the connector terminal of the wire harness side and ground.

### TOOLS:

Peak voltage tester (U.S.A. only)

Peak voltage adaptor 07HGJ-0020100  
(not available in U.S.A.)

with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)

### CONNECTION:

Yellow terminal (+) - White/yellow (-)

*Avoid touching  
the spark plugs  
and tester probes  
to prevent electric  
shock.*

Shift the transmission into neutral.  
Crank the engine with the starter motor and read the peak voltage.

**PEAK VOLTAGE: 0.7 V minimum**

If the peak voltage measured at the ECM multi-connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

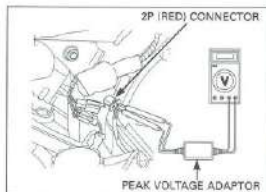
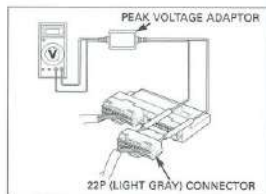
Remove the right side cover (page 2-2).

Disconnect the ignition pulse generator 2P (Red) connector and connect the tester probes to the terminal (Yellow and White/yellow).

In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.

- If the peak voltage measured at the ECM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open circuit or loose connection.
- If the peak voltage is lower than standard value, follow the checks described in the troubleshooting chart (page 17-3).

Install the removed parts in the reverse order of removal.



## IGNITION COIL

### REMOVAL/INSTALLATION

#### NO.1/NO.4 coil

Open and support the front end of the fuel tank (page 3-4).

Remove the spark plug cap.  
Disconnect the ignition primary wires.  
Remove the bolts, clamp, spacers, collars, and ignition coil.

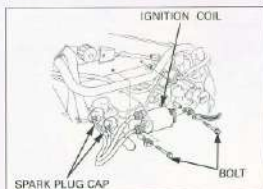
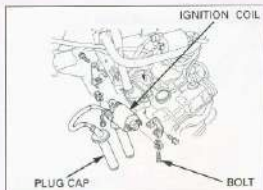
Installation is in the reverse order of removal.

#### NO.2/NO.3 coil

Open and support the front end of the fuel tank (page 3-4).

Remove the spark plug cap.  
Disconnect the ignition primary wires.  
Remove the bolts and ignition coil assembly.  
Remove the bolts, spacer and bracket from the ignition coil.

Installation is in the reverse order of removal.



## IGNITION PULSE GENERATOR

### REMOVAL

Remove the side cover (page 3-4).

Disconnect the ignition pulse generator 2P (Red) connector.

Remove the bolts and ignition pulse generator cover.



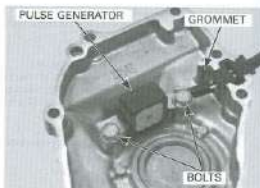


## IGNITION SYSTEM

Remove the dowel pins and gasket.



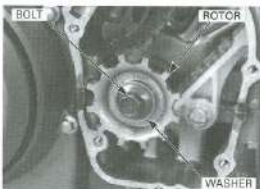
Remove the wire grommet from the cover.  
Remove the bolts and ignition pulse generator.



*If the engine is out of the frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (07725-0040000), then remove the bolt.*

Shift the transmission into 6th gear and apply the rear brake.

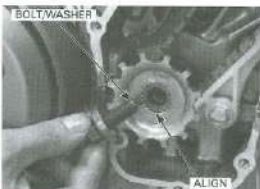
Remove the ignition pulse generator rotor bolt.



## INSTALLATION

Install the ignition pulse generator rotor by aligning the wide groove with the wide teeth of the crankshaft.

Install the washer and rotor bolt.



If the engine is out of frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (07725-0040000), then tighten the bolt.

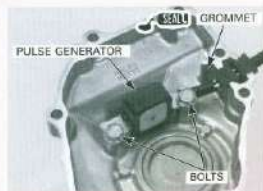
Shift the transmission into 6th gear and apply the rear brake.

Tighten the ignition pulse generator rotor bolt to the specified torque.

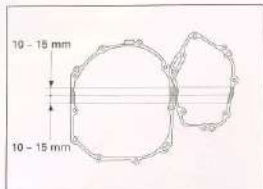
**TORQUE: 59 N·m (6.6 kgf·m, 43 lbf·ft)**



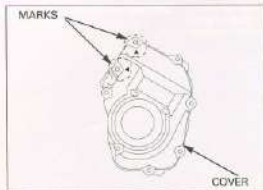
Install the ignition pulse generator into the cover. Apply sealant to the wire grommet, then install it into the groove of the cover.



Apply sealant to the crankcase as shown.



Apply sealant to the bolt threads, then install the bolts into the mark of the ignition pulse generator cover.



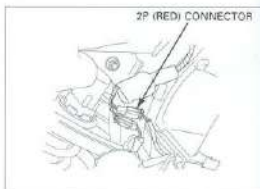
## IGNITION SYSTEM

Install the right crankcase cover, install and tighten the ignition pulse generator cover bolts to specified torque.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**

Route the ignition pulse generator wire properly, connect the 2P (Red) connector.

Install the removed parts in the reverse order of removal.



## IGNITION TIMING

Warm up the engine.  
Stop the engine and remove the timing hole cap.

*Read the instructions for timing light operation.*

Connect the timing light to the No.2 spark plug wire.

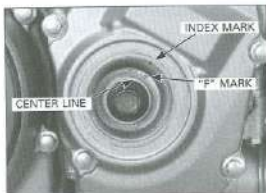


Start the engine and let it idle.

**IDLE SPEED:  $1,200 \pm 100$  min<sup>-1</sup> (rpm)**

The ignition timing is correct if the index mark on the ignition pulse generator cover align with the index line of the "F" mark and center line on the ignition pulse generator rotor.

Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move counterclockwise.



Check that the O-ring is in good condition, replace if necessary.

Apply grease to the timing hole cap threads and install the O-ring and timing hole cap.

Tighten the timing hole cap to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**



## ECM (ENGINE CONTROL MODULE)

### REMOVAL/INSTALLATION

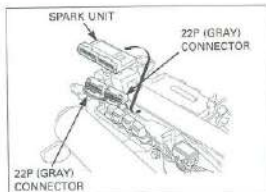
Remove the rear cowl (page 2-2).

Remove the rear side bolts of the rear fender.

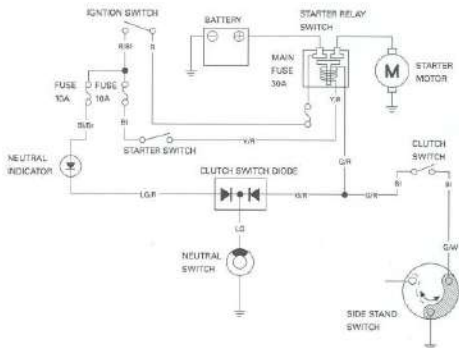
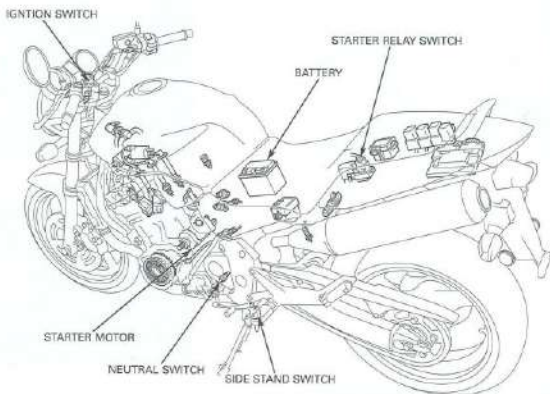
Disconnect the ECM 22P(black), 22P(Gray) connectors.

Remove the ECM.

Install the removed parts in the reverse order of removal.



### SYSTEM DIAGRAM



# 18. ELECTRIC STARTER

SYSTEM DIAGRAM	18-0	STARTER MOTOR	18-4
SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-10
TROUBLESHOOTING	18-2	DIODE	18-11

## SERVICE INFORMATION

### GENERAL

- Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- See section 10 for starter clutch servicing.
- See section 19 for following components:
  - Ignition switch
  - Engine stop switch
  - Starter switch
  - Neutral switch
  - Side stand switch
  - Clutch switch

### SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	4.5 (0.18)

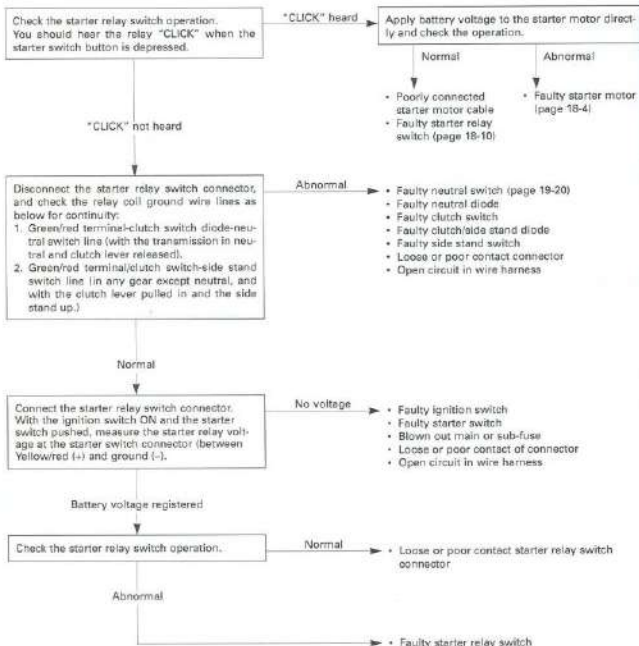
### TORQUE VALUE

Starter motor terminal nut                      12 N·m (1.2 kgf·m, 9 lbf·ft)

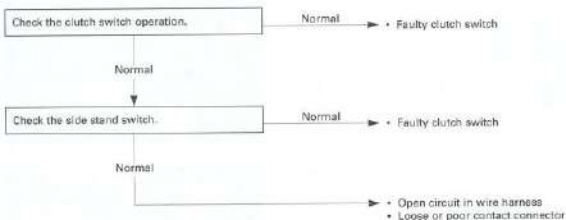
## TROUBLESHOOTING

**Starter motor does not turn**

- Check for a blown main or sub fuse before servicing.
- Make sure the battery is fully charged and in good condition.



The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.



#### **Starter motor turns engine slowly**

- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

#### **Starter motor turns, but engine does not turn**

- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

#### **Starter relay switch "Clicks," but engine does not turn over**

- Crankshaft does not turn due to engine problems



### STARTER MOTOR

#### REMOVAL

With the ignition switch turned to "OFF", remove the negative cable at the battery before servicing the starter motor.

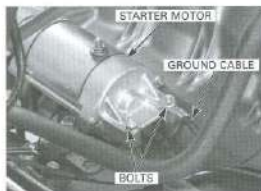
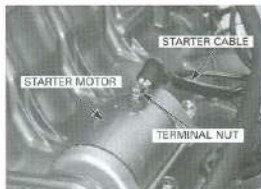
Remove the air cleaner housing (page 5-53).

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the nut and the starter motor cable from the starter motor.

Remove the starter motor mounting bolts and ground cable.

Pull the starter motor out of the crankcase.



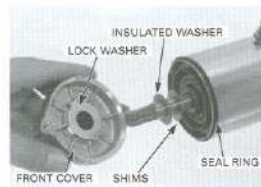
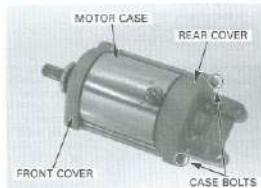
#### DISASSEMBLY

Remove the following:

- Starter motor case bolts
- Rear cover

- Front cover
- Seal ring
- Lock washer
- Insulated washer
- Shims
- Armature

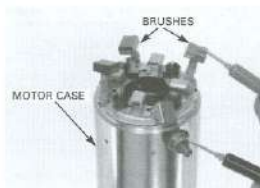
Record the location and number of shims.



## INSPECTION

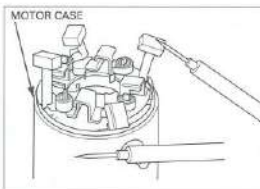
Check for continuity between the brush and cable terminal (the indigo colored wire on the insulated brush holder).

There should be continuity.



Check for continuity between the motor case and cable terminal.

There should be no continuity.

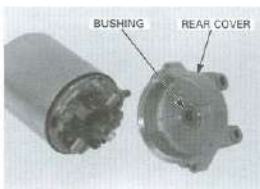


Inspect the brushes for damage and measure the brush length.

**SERVICE LIMIT:** 4.5 mm (0.18 in)

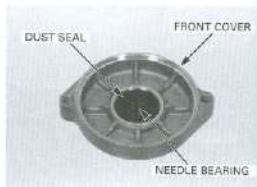


Check the bushing in the rear cover for wear or damage.



## ELECTRIC STARTER

Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.



*Do not use emery  
or sand paper on  
the commutator.*

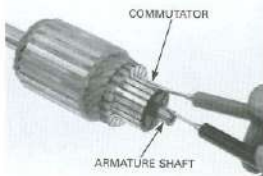
Check the commutator bars of the armature for discoloration.



Check for continuity between pairs of commutator bars.  
There should be continuity.

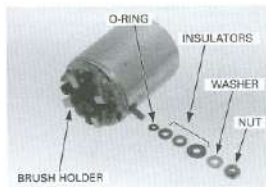


Check for continuity between each commutator bar  
and the armature shaft.  
There should be no continuity.

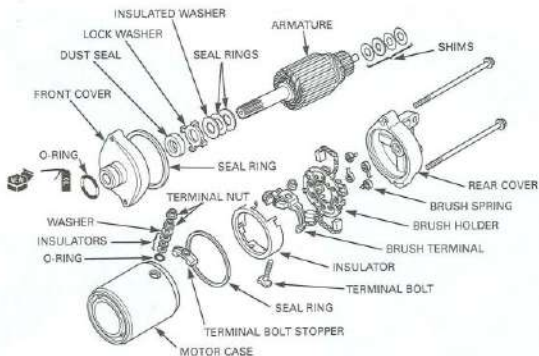


Remove the following:

- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly
- Brush/terminal

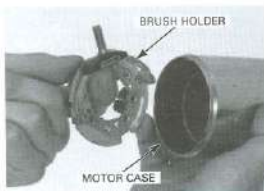


## ASSEMBLY



Install the brushes into the brush holder.  
Install the cable terminal and brush holder into the rear cover, aligning the holder tab with the rear cover groove.

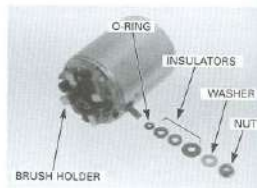
*Align the terminal holder boss with the groove in the motor case.*



## ELECTRIC STARTER

Install the insulators properly as noted during removal.

- Install the following:
- New O-ring
  - Insulated washers
  - Washer
  - Nut



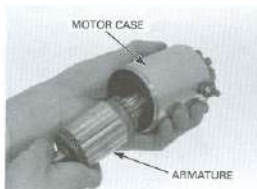
The coil may be damaged if the magnet pulls the armature against the case.

Install the armature in the motor case.

When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

### NOTICE

The coil may be damaged if the magnet pulls the armature against the case.



Install the shims properly as noted during removal.

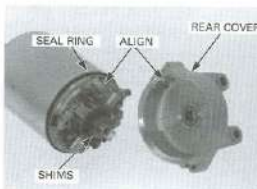
When installing the cover, take care to prevent damaging the oil seal lip with the shaft.

Install the same number of shims in the same location as noted during disassembly.

Install a new seal ring onto the motor case.

Apply a thin coat of grease to the armature shaft end.

Install the rear cover, while pushing in the brushes into the brush holder and aligning the brush holder tab with the motor case groove.



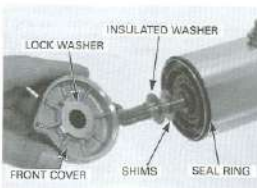
Install the shims properly as noted during removal.

Install the shims and insulated washer onto the armature shaft.

Install a new seal ring onto the motor case.

Apply grease to the oil seal lip and needle bearing in the front cover.

Install the lock washer onto the front cover.  
Install the front cover.



Make sure the index lines are aligned.



Install and tighten the case bolts securely.



## INSTALLATION

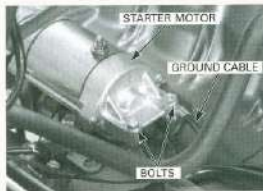
Coat a new O-ring with oil and install it into the starter motor groove.

Install the starter motor into the crankcase.

*Be careful not to damage the water hose.*



Route the starter motor cable and ground cable. Install the ground cable and mounting bolts, and tighten the bolts securely.

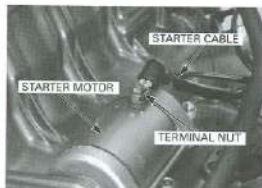


## ELECTRIC STARTER

Install the starter motor cable, then tighten the terminal nut to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Install the rubber cap securely.



## STARTER RELAY SWITCH

### OPERATION INSPECTION

Remove the right side cover (page 2-2).

Shift the transmission into neutral.

Turn the ignition switch ON and engine stop switch to RUN.

Push the starter switch button.

The coil is normal if the starter relay switch clicks.

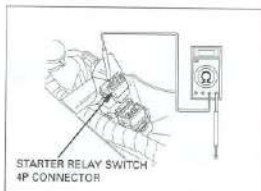
If you don't hear the switch "CLICK," inspect the relay switch using the procedure below.

### GROUND LINE INSPECTION

Disconnect the starter relay switch 4P connector.

Check for continuity between the Green/red wire (ground line) and ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is retracted, the ground circuit is normal (In neutral, there is a slight resistance due to the diode).



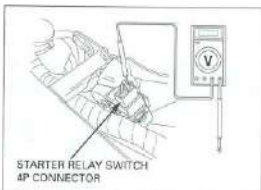
### STARTER RELAY VOLTAGE INSPECTION

Connect the starter relay switch 4P connector.

Shift the transmission into neutral.

Measure the voltage between the Yellow/red wire terminal (+) and ground (-).

If the battery voltage appears only when the starter switch is pushed with the ignition switch ON and engine stop switch at RUN, it is normal.

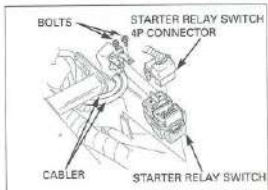


**REMOVAL/INSTALLATION**

Remove the right side cover (page 2-2).

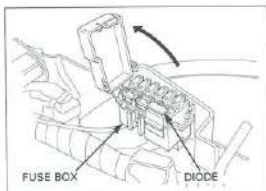
Disconnect the starter relay 4P connector.  
Disconnect the cables from the starter relay.

Remove the starter relay assembly from the frame guide.

**DIODE****REMOVAL**

Remove the right side cover (page 2-2).

Open the fuse box and remove the diode.

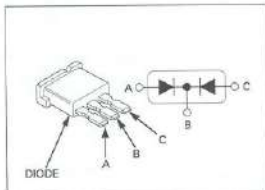
**INSPECTION**

Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity, in one direction, the diode is normal.

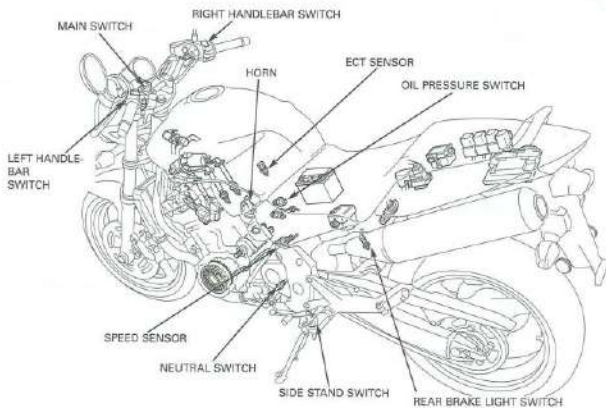
**INSTALLATION**

Install the diode in the reverse order of removal.





## SYSTEM LOCATION



# 19. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION	19-0	OIL PRESSURE SWITCH	19-16
SERVICE INFORMATION	19-1	FAN MOTOR CONTROL RELAY	19-18
TROUBLESHOOTING	19-3	FUEL RESERVE SENSOR	19-18
HEADLIGHT	19-4	IGNITION SWITCH	19-19
TURN SIGNAL	19-6	HANDLEBAR SWITCHES	19-20
TAIL/BRAKE LIGHT	19-7	BRAKE LIGHT SWITCH	19-21
LICENSE LIGHT	19-8	CLUTCH SWITCH	19-21
COMBINATION METER	19-8	NEUTRAL SWITCH	19-21
TACHOMETER	19-11	SIDE STAND SWITCH	19-22
SPEEDOMETER/SPEED SENSOR	19-12	HORN	19-23
COOLANT TEMPERATURE GAUGE/ SENSOR	19-14	TURN SIGNAL RELAY	19-23

## SERVICE INFORMATION

### GENERAL

#### NOTE:

A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.

- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Gray	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

## LIGHTS/METERS/SWITCHES

### SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	Hi	12V – 60 W
		Lo	12V – 55 W
	Brake/tail light		12V – 21/5 W X 2
	Turn signal light	Front	12V – 23/8 W X 2
		Rear	12V – 21 W
	License light		12V – 5 W
	Instrument light		12V – 1.7 W X 3
	Turn signal indicator		12V – 1.7 W X 2
	High beam indicator		LED
	Neutral indicator		LED
	Oil pressure indicator		LED
	PGM-FI warning indicator		LED
	Fuel reserve indicator		LED
Fuse	Main fuse		30 A
	PGM-FI fuse		20 A
	Sub fuse		20 A X 1, 10A X 4
Tachometer peak voltage			10.5 V minimum
ECT sensor resistation	80 °C		2.1 – 2.6 k $\Omega$
	120 °C		0.62 – 0.76 k $\Omega$

### TORQUE VALUES

Coolant temperature/ECT sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Ignition switch mounting bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)
Fan motor switch	18 N·m (1.8 kgf·m, 13 lbf·ft)
Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)
Oil pressure switch wire terminal bolt/washer	2 N·m (0.2 kgf·m, 1.4 lbf·ft)
Neutral switch	12 N·m (1.2 kgf·m, 9 lbf·ft)

ALOC bolt; replace with a new one

Apply sealant to the threads  
Apply sealant to the threads

## TROUBLESHOOTING

## SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operate normally, but the speedometer does not operate

- Faulty speedometer

The speedometer operate normally, but the odometer/trip meter does not operate

- Faulty odometer/trip meter

The speedometer operation is abnormal

- Check for the following before diagnosing.
  - Blown main or sub fuses
  - Loose or corroded terminals of the connectors
  - Discharged battery

Check for loose or poor contact of the speed sensor 3P (Natural) connector. With the ignition switch ON and measure the voltage at the speed sensor connector.

Abnormal

- Loose or poor contact of related terminals
- Open circuit in Black/brown or Green/black wires between the battery and speed sensor

Normal

Check for loose or poor contact of the combination meter multi-connectors. With the ignition switch ON, measure the voltage at the bottom of the speedometer terminals.

Abnormal

- Loose or poor contact of related terminals
- Open circuit in Black/brown or Green/black wires between the battery and speedometer

Normal

With the ignition switch OFF, check for continuity of the Pink/green wire between the terminals of the speed sensor and speedometer.

Abnormal

- Open circuit or loose connection in Pink/green wire

Normal

Support the motorcycle using a hoist or other support to rise the rear wheel off the ground. Measure the output voltage (sensor signal) at the speedometer with the ignition switch is ON while slowly turning the rear wheel by your hand.

Abnormal

- Faulty speed sensor
- Loose speed sensor mounting bolts

Normal

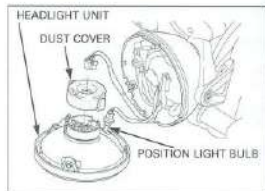
- Faulty speed sensor

# HEADLIGHT

## BULB REPLACEMENT

Remove the headlight unit (page 19-5).  
Disconnect the headlight bulb connector.  
Remove the dust cover.

Remove the position light bulb from the socket.



*If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.*

Unhook the bulb retainer and remove the headlight bulb.

### NOTICE

*Avoid touching halogen headlight bulbs. Finger prints can create hot spots that cause a bulb to break.*

Install a new bulb into the socket.

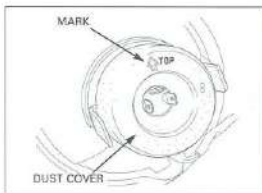
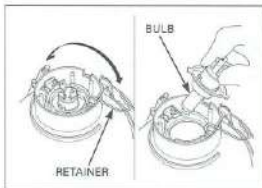
Install the new headlight bulb/socket aligning its tabs with the groove in the headlight unit.

Hook the bulb retainer into the headlight unit groove.

Install the dust cover tightly against the headlight unit with its arrow mark facing up.

Connect the headlight connector.

Install the headlight unit (page 19-5).



## REMOVAL

Remove the screws and headlight unit.

Disconnect the headlight bulb connector (page 19-4).  
Remove the position light bulb socket (page 19-4).



Remove the wires from the clamps.  
Remove the bolts, clamps/nuts and headlight case.  
Remove the wires from the headlight case.



## INSTALLATION

Install the wires to the headlight hole.

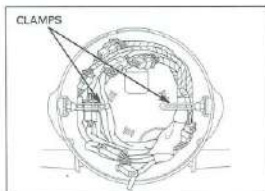
Install the headlight case, then align the index line of the headlight case and turn signal light bracket.

Install the bolts, nuts/clamps and tighten them.

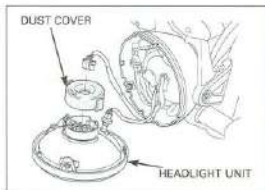


*Route the wires properly (page 7-22).*

Install the wires to the clamp as shown.



Connect the headlight bulb connector.  
Install the position bulb socket.



Install the headlight unit and tighten the screws.

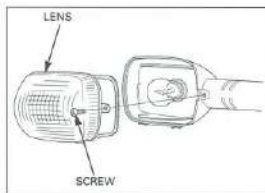
Adjust the headlight A/M (page 3-22).



## TURN SIGNAL

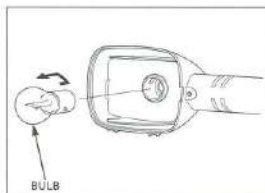
### BULB REPLACEMENT

Remove the screw and turn signal lens.



While pushing in, turn the bulbs counterclockwise to remove them and replace with new ones.

Install the turn signal lens in the reverse order of removal.

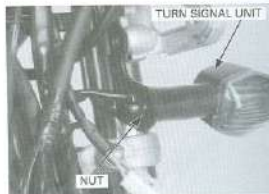


**REMOVAL/INSTALLATION**

Remove the headlight case (page 19-5).  
Disconnect the turn signal wire connectors.



Remove the turn signal mounting nut.  
Release the turn signal wire and remove the turn signal unit.

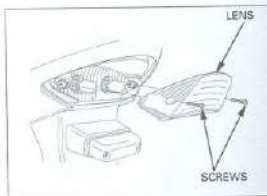


*Route the turn signal wire properly (page 7-29).*

Install the turn signal unit in the reverse order of removal.

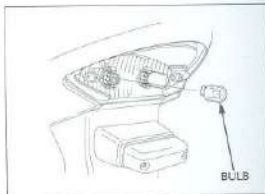
**TAIL/BRAKE LIGHT****BULB REPLACEMENT**

Remove the screws and tail/brake light lens.



Remove the tail/brake light bulbs and replace with new ones.

Install the tail/brake light lens in the reverse order of removal.



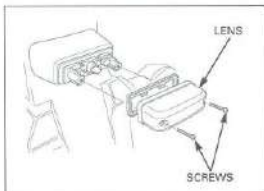


## LICENSE LIGHT

### BULB REPLACEMENT

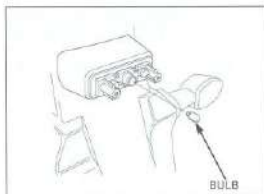
Remove the screws and license light lens.

*Align the tail/brake light unit tabs with the bracket holes.*



Remove the license light bulb and replace with a new one.

Install the tail/brake light lens in the reverse order of removal.

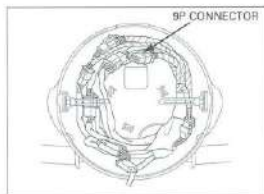


## COMBINATION METER

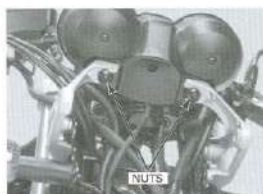
### REMOVAL

Remove the headlight case (page 19-5).

Disconnect the combination meter 9P connectors.

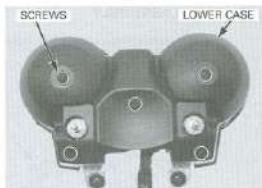


Remove the combination meter mounting nuts and combination meter.

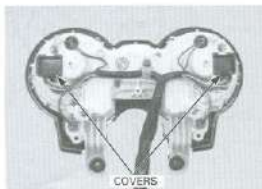


**DISASSEMBLY**

Remove the screws and combination meter lower case.



Remove the rubber cover and bulb sockets.

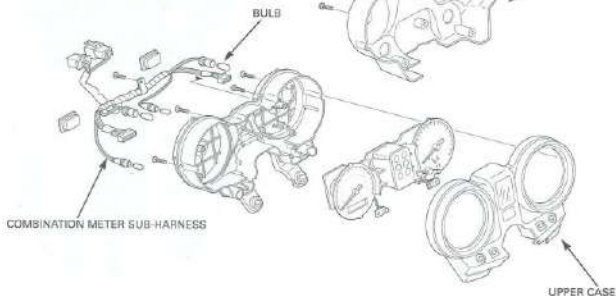


Remove the screws and combination meter upper case.



### ASSEMBLY

Assemble the combination meter in the reverse order of removal.



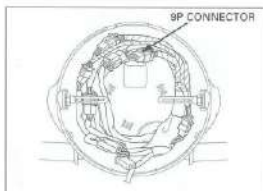
### INSTALLATION

Install the combination meter onto the stay.  
If you remove the rubber collar which is on the stay,  
install it to the original position.  
Install and tighten the combination meter mounting  
nuts securely.

Install the headlight case (page 19-5).



Connect the combination meter 9P connectors.



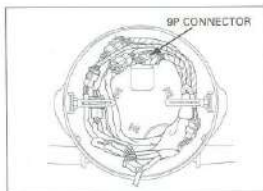
## TACHOMETER

## SYSTEM INSPECTION

Remove the headlight unit (page 19-5).

Disconnect the combination meter 9P (Black) connector.

Check for loose or poor contact terminals of the combination meter.



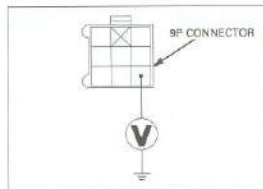
With the ignition switch ON, measure the voltage at the combination meter 9P (black) connector.

## CONNECTION:

Black/brown (+) - Ground (-)  
Standard: Battery voltage

If there is no voltage, check for the following:

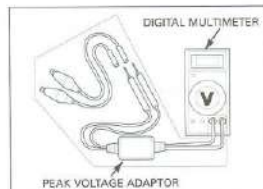
- Circuit in Black/brown wire
- Battery
- fuse (10A)



Connect the peak voltage adaptor (page 17-4).

## TOOLS:

Peak voltage tester (U.S.A. only)  
Peak voltage adaptor 07HGJ-0020100  
(not available in U.S.A.)  
with commercially available digital multimeter  
(impedance 10 M $\Omega$ /DCV minimum)

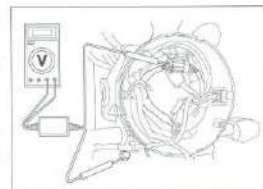


Connect the combination meter 9P (Black) connector.  
Connect the peak voltage adaptor to the tachometer Yellow/green (+) terminal and ground.

Start the engine and measure the tachometer input peak voltage.

**PEAK VOLTAGE: 10.5 V minimum**

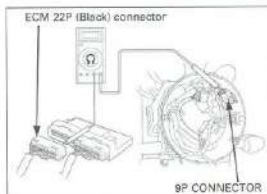
If the value is normal, replace the combination meter assembly.  
If the measured value is below 10.5 V, replace the ECM.



If the value is 0 V, perform the following:  
Disconnect the combination meter 9P (Black) connector (page 19-8).  
Disconnect the ECM 22P (Black) connector (page 17-11).

Check for continuity between the combination meter 9P (Black) connectors terminal and the ECM multi-connector Yellow/green terminals.

If there is no continuity, check the wire harness and combination meter sub-harness for an open circuit.  
If there is continuity, replace the ECM.



## SPEEDOMETER/SPEED SENSOR

### SYSTEM INSPECTION

Remove the left side cover (page 2-2)

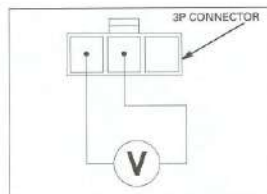
Disconnect the speed sensor 3P connector and check for loose or poor contact of the connector.



With the ignition switch is ON and measure the voltage at the speed sensor 3P connector of the wire harness side.

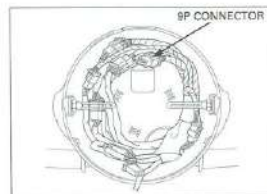
### CONNECTION:

Black/brown (+) - Green/black (-)  
Standard: Battery voltage



Remove the headlight unit (page 19-5).

Check for loose or poor contact of the combination 9P connectors.



With the ignition switch ON and measure the voltage at the bottom of the combination meter terminals.

**CONNECTION:**

Black/brown (+) – Green (–)

Standard: Battery voltage

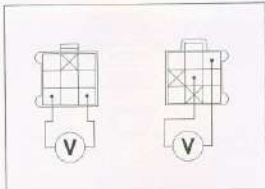
**CONNECTION:**

Red/green (+) – Green (–)

Standard: Battery voltage

If there is no voltage, check for the following:

- Wire harness
- Battery
- fuse (10A)

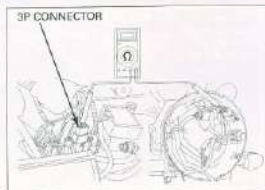


Disconnect the speed sensor 3P connector.  
Disconnect the combination 9P (Black) connector.

With the ignition switch OFF, check for continuity of the Pink/green wire between the speed sensor connector and combination meter terminal.

There should be continuity.

If there is no continuity, check the wire harness.



Support the motorcycle using a hoist or other support to rise the rear wheel off the ground.

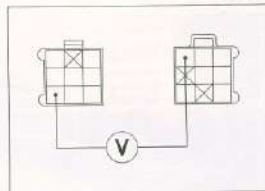
Measure the voltage at the combination meter terminals with the ignition switch ON while slowly turning the rear wheel by hand.

**CONNECTION:**

Pink/green (+) – Green (–)

Standard: Repeat 0 to 5 V

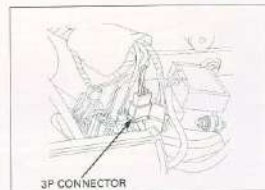
If the measurement is out of specification, inspect the open circuit in wire harness.



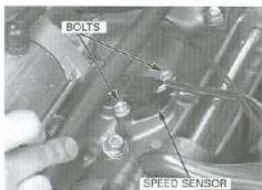
## SPEED SENSOR REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-53).

Disconnect the speed sensor 3P connector and check for loose or poor contact of the connector.



Remove the bolts and speed sensor.



Remove the O-ring.

*Route the speed sensor wire properly (page 1-28).*

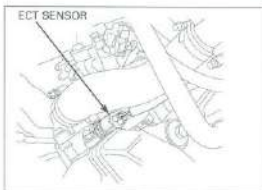
Installation is in the reverse order of removal.



## COOLANT TEMPERATURE GAUGE /SENSOR

### INSPECTION

Disconnect the ECT (engine coolant temperature) sensor wire connector from the sensor.  
Ground the ECT sensor connector Green/blue terminal with a jumper wire at the wire harness side.



Turn the ignition switch ON and check the coolant temperature gauge.  
Disconnect the thermo sensor wire connector from the ground immediately if the gauge needle moves fully to H.

### NOTICE

*Immediately disconnect the sensor wire connector from the ground when the needle move to H (hot) to prevent damage to the gauge.*



If the needle moves, check the ECT sensor unit (see below).

If the needle does not move, check for voltage between the sensor wire connector and ground.

If the voltage is measured, the coolant temperature gauge unit is faulty.

If there is no voltage, check for voltage between the Black/Brown and Green/Blue wire terminal.

If there is no voltage between the terminal, coolant temperature gauge unit is faulty.

If a voltage is measured, check for the wire harness.

## ECT SENSOR UNIT INSPECTION

Remove the ECT sensor (page 6-3).

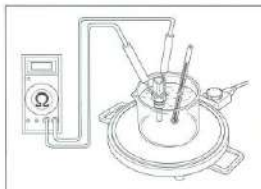
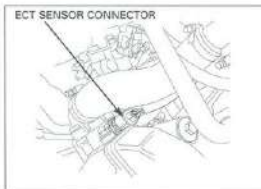
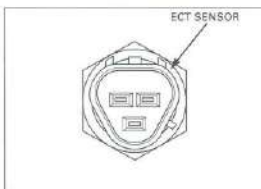
Disconnect the wire connector from the ECT sensor and remove the sensor.

Suspend the ECT sensor in a pan of coolant (50 – 50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

- Soak the ECT sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT sensor touch the pan.

Temperature	80°C (188°F)	120°C (248°F)
Resistance	2.1 – 2.6 k $\Omega$	0.62 – 0.76 k $\Omega$

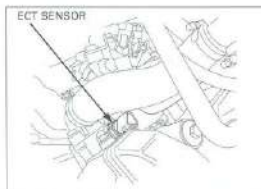
Replace the sensor if it is out of specification by more than 10% at any temperature listed.



*Always replace the sealing washer with a new one.*

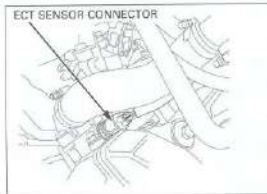
Install and tighten the ECT sensor to the specified torque.

**TORQUE: 23 N·m (2.3 kgf-m, 17 lbf-ft)**





- Connect the ECT/thermo sensor connector.
- Fill the system and bleed the air (page 6-4).



## OIL PRESSURE SWITCH

### INSPECTION

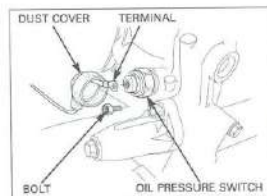
If the oil pressure warning indicator stays on while the engine is running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator come on with the ignition switch ON.



If the indicator does not come on, inspect as follows.

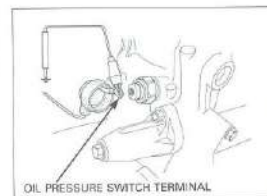
- Remove the dust cover.
- Remove the bolt and oil pressure switch terminal.



Short the oil pressure switch wire terminal to ground using a jumper wire.

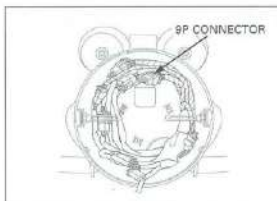
The oil pressure warning indicator comes on when the ignition switch is ON.

If the light does not come on, check the sub-fuse (10A).



Check for continuity between the combination meter 9P connectors terminal and the oil pressure switch wire Blue/red terminals.

If there is no continuity, check the wire harness and combination meter sub-harness for an open circuit.



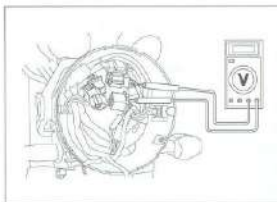
With the ignition switch ON, measure the voltage at the bottom of the combination meter terminals.

**CONNECTION:**

Blue/red (+) – Green (-)

Standard: Battery voltage

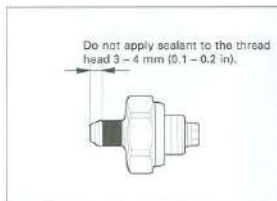
If the value is normal, replace the combination meter assembly.



## REMOVAL/INSTALLATION

Remove the boot, terminal bolt and wire terminal.  
Remove the oil pressure switch from the crankcase.

Apply sealant to the oil pressure switch threads as shown.



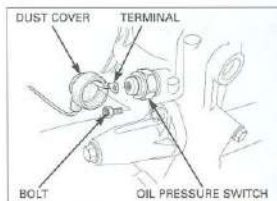
Install the oil pressure switch onto the crankcase, tighten it to the specified torque.

**TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)**

Connect the oil pressure switch terminal to the switch and tighten the screw to the specified torque.

**TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)**

Install the dust cover.



## FAN MOTOR CONTROL RELAY

### INSPECTION

Open and support the front end of the fuel tank (page 3-4).

Check for a blown fuse before inspection.

#### Fan motor does not stop

Turn the ignition switch OFF, disconnect the fan motor control relay 4P connector and turn the ignition switch ON again.

If the fan motor does not stop, check for a shorted wire between the fan motor and relay.

If the fan motor stops, replace the fan motor control relay.

#### Fan motor does not start

Before testing, warm up the engine to the operating temperature.

Disconnect the fan motor control relay 4P connector and short the Red/green and Black/blue terminals of the connector with a jumper wire. Turn the ignition switch ON and check the fan motor.

If the motor does not start, check the connection at the fan motor 2P connector, and between the Open circuit in Black/blue wire.

Wire harness is OK, Check for below

With the ignition switch is ON and measure the voltage at the fan motor control relay 4P connector.

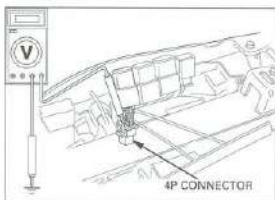
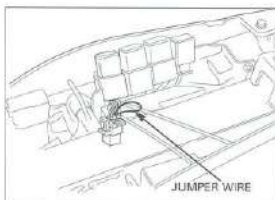
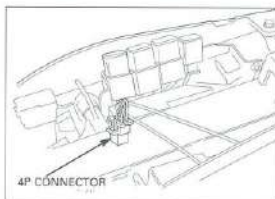
#### CONNECTION:

Black/white (+) – Ground (–)

Standard; Battery voltage

If there is no voltage, check for open circuit in Black/white wire.

If the value is normal, replace the fan motor control relay.

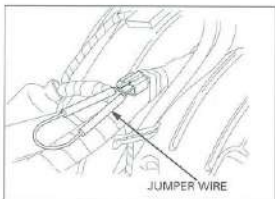


## FUEL RESERVE SENSOR

### INSPECTION

Turn the ignition switch is ON and make sure the fuel reserve indicator come ON.

If the fuel reserve indicator does not indicate properly, check for the following.



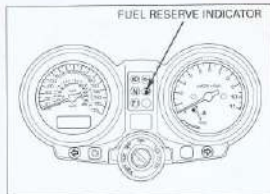
Disconnect the fuel reserve sensor 3P connector. Short the wire harness side connector Red/black and Green terminals with a jumper wire.

Turn the ignition switch is ON and make sure the fuel reserve indicator come ON.

If the indicator comes ON, replace the fuel pump assembly.

If the indicator still comes ON, check for an open or short circuit in wire harness.

If the wire harness is OK, replace the combination meter.

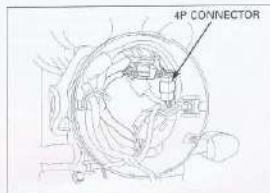


## IGNITION SWITCH

### INSPECTION

Remove the headlight unit (page 18-5).

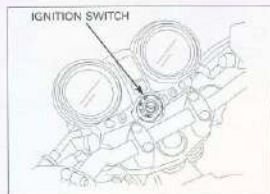
Disconnect the ignition switch wire 4P connector.



Check for continuity between the wire terminals of the ignition switch connector in each switch position. Continuity should exist between the color coded wires as follows:

### IGNITION SWITCH

	FAN	IG	BAT1	DIODE	KEY
ON	○	○	○		KEY ON
OFF		○		○	KEY OFF
LOCK		○		○	KEY OFF LOCKPIN
COLOR		R/BI	R	P	



### REMOVAL/INSTALLATION

Remove the top bridge (page 13-25).

Remove the bolts and ignition switch.

Install the ignition switch in the reverse order of removal.

Tighten the ignition switch mounting bolt to the specified torque.

**TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)**

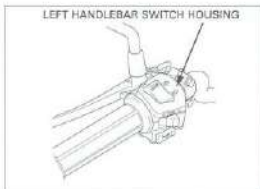
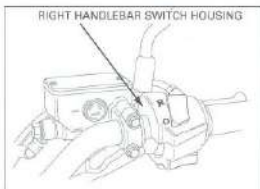


# HANDLEBAR SWITCHES

Remove the headlight unit (page 19-5).

Disconnect the handlebar switch connectors.

Check for continuity between the wire terminals of the handlebar switch connector. Continuity should exist between the color coded wire terminals as follows:



## ENGINE STOP SWITCH

	IG	BAT2
OFF		
RUN	○	○
COLOR	Bl	W/Bl

## STARTER SWITCH

	ST	IG	BAT4	HL
FREE			○	○
PUSH	○	○		
COLOR	Y/R	Bl	Bl/R	Bu/W

## TURN SIGNAL SWITCH

	W	R	L	P	PR	PL
R	○	○		○		○
N						
L	○		○	○	○	
COLOR	GR	Lb	○	W/Bl	Sb/W	Q/W

## PASSING SWITCH

	BAT	Hi
FREE		
PUSH	○	○
COLOR	B/R	

## DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
(N)	○	○	○
Hi	○		○
COLOR	Bu/W	W	Bu

## HORN SWITCH

	Ho	BAT
FREE		
PUSH	○	○
COLOR	Lg	Bl/Br

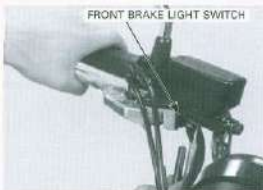


## BRAKE LIGHT SWITCH

### FRONT

Disconnect the front brake light switch connectors and check for continuity between the terminals.

There should be continuity with the brake lever applied, and there should be no continuity when the brake lever is released.

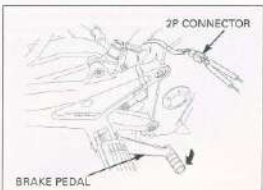


### REAR

Remove the seat (page 2-2).

Disconnect the rear brake light switch connector and check for continuity between the terminals.

There should be continuity with the brake pedal applied, and there should be no continuity when the brake pedal is released.



## CLUTCH SWITCH

Disconnect the clutch switch connectors.

There should be continuity with the clutch lever applied, and there should be no continuity when the clutch lever is released.

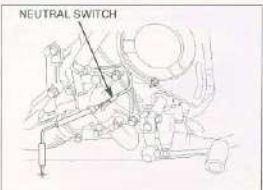


## NEUTRAL SWITCH

Disconnect the neutral switch connector from the switch.

Shift the transmission into neutral and check for continuity between the Light green wire terminal and ground.

There should be continuity when the transmission is in neutral, and no continuity when the transmission is in gear.

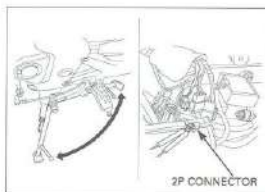
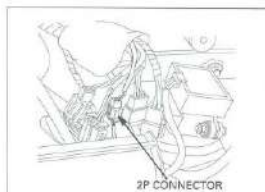


## SIDE STAND SWITCH

### INSPECTION

Disconnect the side stand switch 2P (Green) connector.

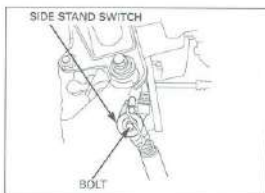
Check for continuity between the wire terminals of the side stand switch connector. Continuity should exist only when the side stand is UP.



### REMOVAL

Disconnect the side stand switch 2P (Green) connector.

Remove the bolt and side stand switch.

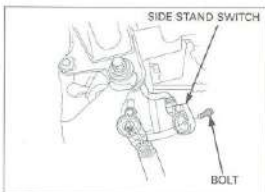


### INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.

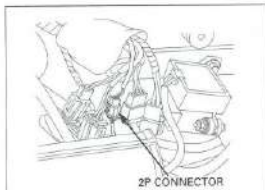
Secure the side stand switch with a new bolt.

**TORQUE: 10 N·m (1.0 kgf-m, 7 lbf-ft)**



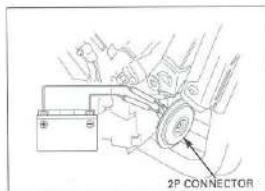
Connect the side stand switch 2P (Green) connector.

Install the side cover (page 2-2).



Disconnect the wire connectors from the horn.

Connect the 12V battery to the horn terminal directly. The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



## TURN SIGNAL RELAY

### INSPECTION

Check the following:

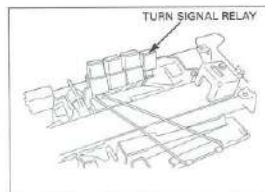
- Battery condition
- Burned out bulb or non-specified wattage
- Burned fuse
- Ignition switch and turn signal switch function
- Loose connectors

If the above items are all normal, check the following:

Remove the rear cowl (page 2-3).

Disconnect the turn signal connectors from the relay.

Short the White/green and Gray terminals of the turn signal relay connector with a jumper wire. Start the engine and check the turn signal light by turning the switch ON.



Light comes on

Light does not come on

- Broken wire harness

Check for continuity between the Green terminal of the relay connector and ground.

Continuity

No continuity

- Broken wire harness

- Faulty turn signal relay.
- Poor connection of the connector.





# 21. TROUBLESHOOTING

**ENGINE DOES NOT START OR IS  
HARD TO START**

21-1

**ENGINE LACKS POWER**

21-2

**POOR PERFORMANCE AT LOW  
AND IDLE SPEED**

21-3

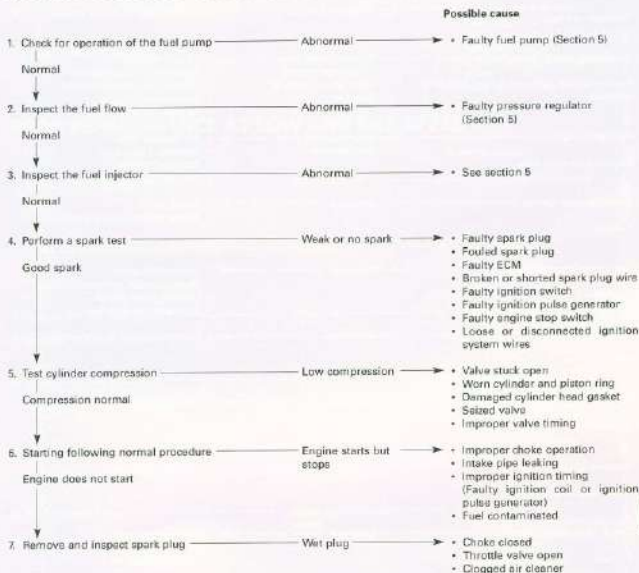
**POOR PERFORMANCE AT HIGH  
SPEED**

21-4

**POOR HANDLING**

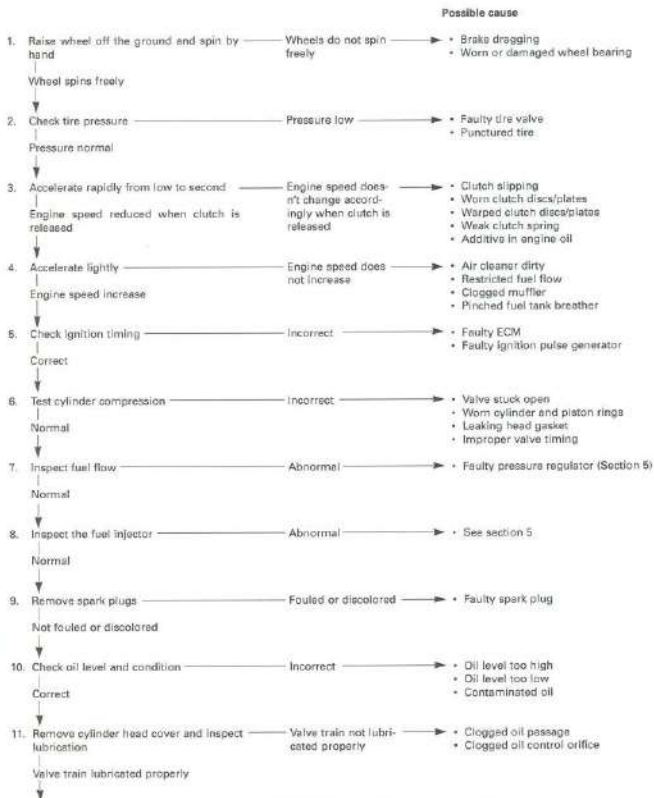
21-4

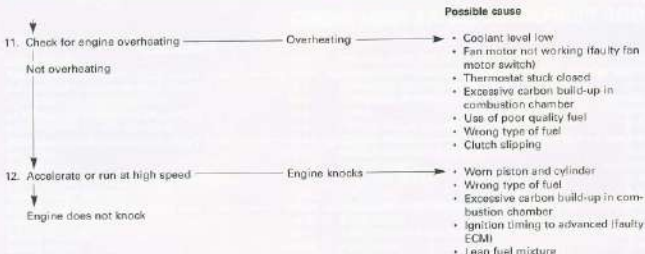
## ENGINE DOES NOT START OR IS HARD TO START



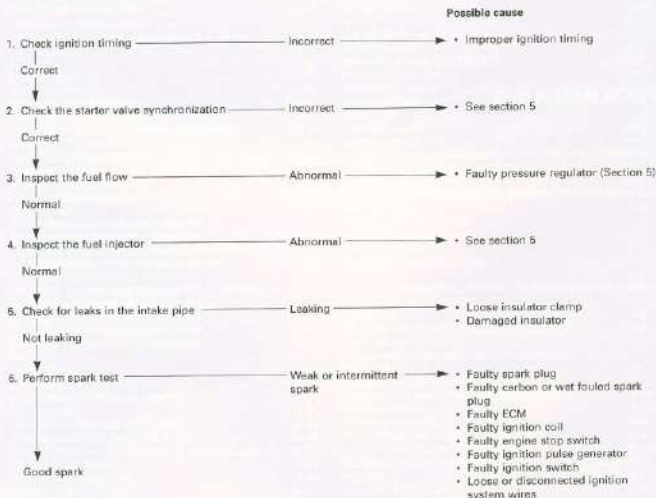
**21**

## ENGINE LACKS POWER

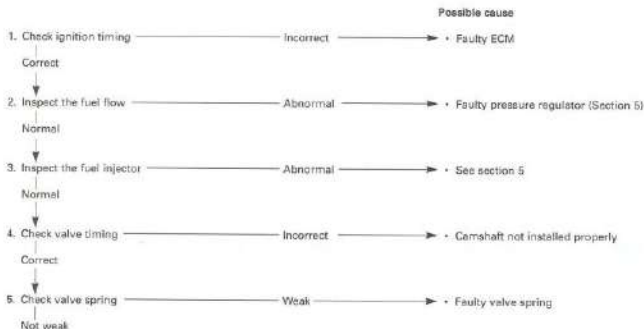




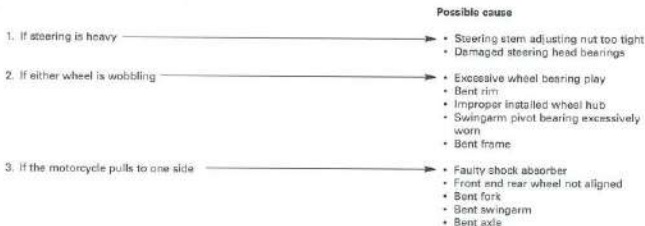
## POOR PERFORMANCE AT LOW AND IDLE SPEED



### POOR PERFORMANCE AT HIGH SPEED



### POOR HANDLING



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